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## REZidential Housing: A Prototype for the Winnebago Tribe

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## REZidential Housing

### **REZidential Housing:**

A Prototype for the Winnebago Tribe

By

Alissa Piere

A Terminal Project

Presented to the Faculty of

The College of Architecture at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Master of Architecture

Major: Architecture

Under the Supervision of the Professors

Zeynep Kezer and Martin Despang

Lincoln, Nebraska May 2006





### ABSTRACT

This project investigates the current housing challenges of the Winnebago Indian Reservation located in North-east Nebraska. The project will develop prototypical solutions to the housing problems and design the residential environment on the reservation at three different levels: 1- the domestic unit itself, 2- at the level of the immediate community formed by the clustering homes within a neighborhood and the indoor/outdoor spaces they share, and 3- at the level of the site plan.

### BACKGROUND

Historically Native American architecture was an expression of the identity of the people who created it and served as a visual reminder of their community values. Colonization by European settlers has dislocated Native American Tribes from their traditional homelands and forever disrupted their everyday lives and patterns of settlement. Since the 1950's many Native Americans have been placed into government subsidized housing by HUD. These homes fail to meet their spatial and cultural needs and the consequent alienation the Native American's suffer exacerbates the overall sense of poverty, dislocation, and cultural conflict. More recently, in addition to renewed efforts by HUD to address these concerns, many independent organizations in the United States and Canada are attempting to solve the Native American housing problems in the reservations with mixed success. Despite all attempts, many Natives are still in houses inappropriate to their needs, while others are homeless.

### OBJECTIVES

The specific project objectives, listed below, were developed through rigorous investigation of the Winnebago people, their architectural history, the community's cultural transformations, the current housing environment, and the way in which the community has reacted to the current housing situation.

- Incorporate family involvement in the design and construction of the houses.
- Utilize green building techniques for energy saving benefits.
- Provide Shared space for dining within site plan.
- Create flexible houses that are able to adapt to changing family sizes and are quick and inexpensive to construct.

While excavating the Winnebago's historic traditions has been an important aspect of my research, my project acknowledges that the tribe has adapted itself to contemporary mainstream American culture. Hence, while I hope to develop an environment that allows the Winnebago to maintain their cultural continuity, my goal is not to replicate directly architectural solutions from the past.





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## Introduction

This project investigates the current housing challenges of the Winnebago Indian Reservation located in Northeast Nebraska. The project will develop prototypical solutions to the housing problems and design the residential environment on the reservation at three different levels: 1- the domestic unit itself, 2- at the level of the immediate community formed by the clustering homes within a neighborhood and the indoor/outdoor spaces they share, and 3- at the level of the site plan. The project includes working closely with the Winnebago tribe to ensure an accurate depiction of their current housing situation and the problems that are facing the people today. Because this is an architectural thesis project many of the problems concerning government policy will be addressed as problems but will focus on the design of the environment rather than a evaluation of policy.



Historically Native American architecture was an expression of the identity of the people who created it and served as a visual reminder of their community values. Colonization by European settlers has dislocated Native American Tribes from their traditional homelands and forever disrupted their everyday lives and patterns of settlement. Since the 1950's many Native Americans have been placed into government subsidized housing by HUD. These homes fail to meet their spatial and cultural needs and the consequent alienation the Native American's suffer exacerbates the overall sense of poverty, dislocation, and cultural conflict. More recently, in addition to renewed efforts by HUD to address these concerns, many independent organizations in the United States and Canada are attempting to solve the Native American housing problems in the reservations with mixed success. Despite all attempts, many Natives are still in houses inappropriate to their needs, while others

are homeless.

While excavating the Winnebago's historic traditions has been an important aspect of my research, my project acknowledges that the tribe has adapted itself to contemporary mainstream American culture. Hence, while I hope to develop an environment that allows the Winnebago to maintain their cultural continuity, my goal is not to replicate directly architectural solutions from the past.



## Background

### NATIVE AMERICAN HOUSING

Most housing problems developed with the creation of the reservations in the seventeenth century. <sup>1</sup> After the founding of the United States, British settlers formed treaties using bribery and coercion to convince the Natives to give up their territory. The British reformers then developed three main proposals to compensate the Native's loss of land. First - offer individual tribes land, second - treat their land as sovereign nations, and third - provide Natives with living support such as shelter, food, education, etc. (Prucha, 2-10).

The Native's entire existence was previously based off an equilibrium of taking from and giving back to Mother Earth. There was not a need to have more than

1        The traditional way of living off the land was made difficult when living on a reservation, meals, clothing, and shelter were given to tribal members from the government instead, losing control over basic elements of life.

necessary; every animal killed was used in its entirety, from food to clothing, to shelter. The traditional nomadic lifestyle of hunting and gathering was no longer possible when people were forced to live within limited reservation boundaries. Because they had no other choice, a dependence formed on the U.S. Government for every day necessities.

The United States has an obligation to provide safe, decent and affordable housing to its Native people, however the housing on reservations is substandard in comparison to housing nationwide. <sup>2</sup> Because of the disconnection between the U.S. government and Native Americans, the Native Americans have fallen victim to the every changing policies of the government as well as problems of misunderstanding and indifference

2        Housing conditions on reservations include severe overcrowding, deterioration, mold, insect/rodent infestation, inadequate ventilation and or heating, and lack of infrastructure support including roads, sewer, water.

between the two groups. The guidelines and regulations that are used for Native American housing are based off public housing programs. They were developed with little or no input from the Native people. The designs of the communities are often based on an outsider's opinion of the general Native necessities. The designs of the homes are based off economics, and little government money is spent on tribal research and culturally sensitive architecture.



## SOCIAL/PHYSICAL EFFECTS

Through observation, it is apparent that many of the government funded houses deteriorate soon after a family moves in. Some houses fall below the point of adequate shelter, becoming detriments to physical and psychological health. Households that are not adequate for shelter, and homes that are not socially, or culturally stimulating, lead to social dysfunction. Inadequate housing in reservations contributes to high rates of obesity, alcoholism, and mental health disorders (Jackson, 31-34).

Lack of pride and sense of ownership, poor construction materials, and no funding or support for maintenance and remodeling contributes to the occurrence of deteriorating houses. There are three main reasons for residents to lack in pride and ownership of their houses: 1- Housing units are not appropriate to the

cultural needs of the residents, 2- many residents have little or no involvement in the design or construction of their houses, and 3 – depending on their economic standpoint, the family may not have to pay for their house.

Overcrowding on the reservation is also a concern. It is part of the Native culture to treat all relatives as close family, and generosity has always been a part of their cultural pride. When a family member is in need, it is common for another family to take them in giving them shelter, food, clothing etc. Many Winnebago feel that the entire tribe is their family and it does not matter who belongs to which family. With the shortage of available housing in addition to the majority of the homes at a substandard level, many reservation houses succumb to overcrowded conditions. It is not uncommon to find as many as 18 to 20 people living under one roof. Colds, flu, lice, lung infections, and other diseases are hard to





control when so many people use the same beds and bathroom facilities. Child rearing is often compromised in overcrowded conditions. Some children are simply neglected when there are so many people around. The mixing of generations in housing lacking privacy often leads to early sexual awareness and activity, early pregnancies—and sometimes sexual abuse. It is difficult for school-aged children to sleep in homes where alcoholism and overcrowded conditions are rampant. Children are disturbed by television or loud talking, consequently, the children are sleep deprived and failing to stay alert in school (Chester, 10).





The Winnebago Tribe

## THE WINNEBAGO TRIBE (HISTORY)

Like other tribes that were displaced, the Winnebago tribe was moved from their original location near the Green Bay area of the great lakes, to what is now Nebraska. Modern Winnebago people first made contact with Europeans in 1614, when they encountered French explorers near the eastern borders of Lake Superior. In 1634, the tribe numbered around twenty-five thousand people. By 1640 it had been reduced to a little over a hundred souls. This population loss was due to three massive smallpox epidemics and war with surrounding Algonquian tribes. The tribe signed their first treaty with the United States in 1816 in which relocated them from Northwest Iowa, to Minnesota, South Dakota, and finally to their current location in Northeast Nebraska (Smith, 1).





## WINNEBAGO TRADITIONAL HOUSING

It is important to understand the Native American architectural history, to identify the differences of their past environment and their environment today. Before the reservation housing system began, the Winnebago tribe had its own unique style of creating their shelter. Like most other tribes of the Great Plains, the Winnebago used materials directly from the earth to create their homes. They had eight known types of lodges(a term for an enclosed structure): The gable lodge, the round lodge, the long lodge (or longhouse), the tipi, the grass lodge, the platform lodge, the ceremonial lodge, and the sweat lodge (Nabokov, Easton, 52).

The Gable Lodge was the oldest known form of shelter to the Winnebago. Poles of cedar, forked at the top, formed the sides. Through the forks transverse poles

were laid to which the gable roof was attached. Three poles were arranged in the center of the lodge for the better support of the roof. Beds were placed along both of the long sides on a platform raised 2 feet. Frequently a platform 4 to 5 feet high was erected in the rear of the lodge and partitioned off. Here the favorite child of the family lived when he was fasting. There were two doorways to the lodge, often entrances where shaded. According to another description of the gable lodge, there were only two central poles, one at each entrance; these were always painted blue to symbolize the day (Radin, The Winnebago Tribe, 104).

The longhouse was one of the most common forms of shelter used. The Winnebago had three varieties- one made entirely of bark, another made entirely of reed matting, and another of bark with a roof covering of reed matting. The houses were constructed in a very simple manner using poles if ironwood driven into the

ground, bent over and tied to other poles which contact them from the opposite direction. The poles were tied together with basswood bark at the joints. The same material was used in attaching to these poles the cedar bark that forms the walls of the lodge. The walls were supported on the inside by a varying number of poles attached to the corresponding poles of the other side. Sometimes a series of transverse poles were inserted beneath the exterior vertical poles. The bark roofs were incased in frames made of irregularly distributed vertical poles with generally one transverse pole. If the roofs were made of reed matting two or three of the external poles have poles attached to them which are arched across the matting. The reed matting lodges, as a rule, have no external vertical poles and only two transverse poles each, one on the outside and one on the inside (Radin, The Winnebago Tribe 105).

The longhouse varied in length but was always from

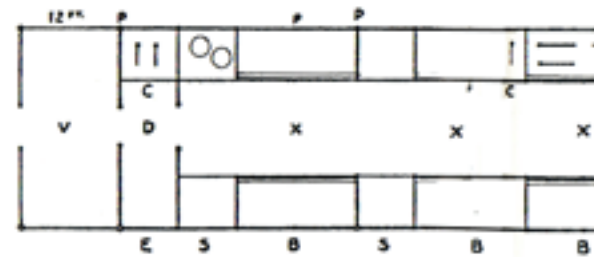
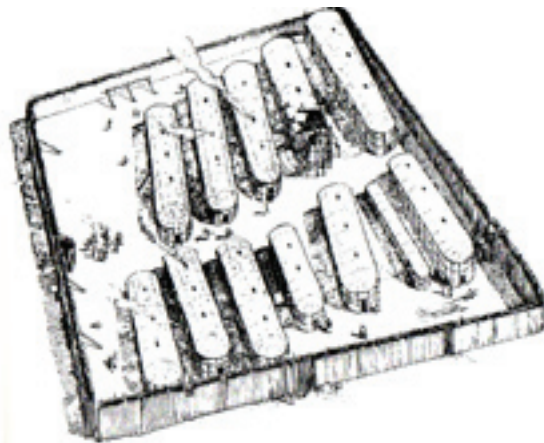
20-30 feet wide. Depending on the size of the family the longhouse would be from 40- 400 feet long. On the front and back entrances were representation of the family's (or clan's) symbolic animal. In each house the oldest woman held position as the reigning longhouse "mother." The house was enlarged to accommodate new couples from the matriarchal family, the size of the house became a rough indicator of how many in-laws it had acquired and of how long it had stood in the village.

There were typically two types of roofs used on the longhouse, one was a barrel-roof with poles bent to the form of a bow, and the other was a gable roof. The Winnebago used elm wood for the structure, and bark peeled from trees as a skin. They cut pieces of bark that were typically 6 feet long by a foot wide and assembled on the exterior of the building using basswood, and ropes to attach it. Smoke holes in the longhouse roofs were





Structural Diagram



Floor plan



the sole source of light, however, some basswood bark houses built by the Iroquois had sliding wall shutters on the side walls for illumination.

A central corridor divided the floor area. Each family had their private domestic space, and they shared a space in the center with the family across. Every 20 feet or so a hearth with its own smoke hole was shared by two families whose private domains were across the aisle from one another. On either side low bunks about 6 feet long ran along the side walls. 6 feet was usually the unit of measurement used throughout the house. There would also be a transition space between each set of shared spaces that was used as a storage space for dried food goods, clothing, and hunting supplies (Nabokov, 82).

The other forms of shelter such as the grass lodge and the tipi were used for hunting purposes, and in the time

of war. The other shelters mentioned were mostly used for ceremonial purposes such as the sweat lodge, the platform lodge, and the ceremonial lodge (Radin, The Winnebago Tribe 25).



Wigwam







Teepee



Inside



Wigwam Structure





## WINNEBAGO TODAY

The population living on the reservation today is approximately 1,500 people; however, the total Winnebago population in the United States is approximately 4,000 people. The Winnebago reservation is adjacent to the Omaha Indian reservation. Both reservations encompass the entire area of Thurston county in Northeast Nebraska. The land is mostly grassy plains, with wooded areas near the Missouri river. The majority of the land is used as farm land, while some land



is used for ranching, and some is set aside for wildlife. The climate is temporal with harsh cold winters and hot humid summers.

The town named Winnebago lies within the Winnebago reservation. It is a small town with a population near 1,000 people (the other 500 people live outside of town) that is located on Hwy 77, 25 miles south of Sioux City (Iowa), and 10 miles north of Walthill (Nebraska). The town is also at the intersection on Hwy 75 with Hwy 77 so there is a large amount of traffic passing through. Directly to the east and a few miles north of the town is the Missouri river. The tribe owns the land up to the river, and a small patch of land on the other side of the river in Iowa, because of the change in the river channel since the time the reservation was allotted to the tribe.

In diagram A, the circle #1 shows the main town center. The #2 shows the Pow wow ceremonial grounds which will be discussed on page 58. In diagram B we can

see the general layout of the town. The town is small, consuming one post office, one building containing offices, one volunteer fire department, a convenience store/gas station, three churches, one school with track



Diagram A



and field facilities, one hospital, and one tribal college. Most of the older residential area is to the east of highway 77. On the other side of the highway are most of the business and government offices. There are two newer residential developments located to the north and south of the town. There are other residential areas scattered outside of the immediate village area in groups and small clusters of government-funded homes.

Mostly every family has a car. It is also common for each person of legal driving age to have his or her own vehicle. It is a necessary object to own here where one must drive 25 miles to the nearest grocery store, mall, movie theatre, or anything else in South Sioux City. Those families without a vehicle share with extended families. It is not unusual for people to stand to the north of the village on Hwy 77 hoping someone going north will give them a ride.



Diagram B



## WINNEBAGO HOUSING TODAY

Currently there are 180 HUD homes on the reservation . Winnebago is in need of a new housing system. The community is currently suffering from many of the psychological and physical effects from inadequate housing mentioned earlier. Observations of the current housing situation reveal a large portion of homes in severe neglect, and abandonment. At the same time, there are a large number of new homes under construction. It is a constant team available.

Approximately 110 are low rent and 70 are mutual help, which are homes that will eventually be owned by the residents. The mutual help homes are located on land that is purchased from the tribe by the owner, the rent homes are located on tribal land. There is approximately a 5 year waiting list for a house on the reservation. In the next 10 years there will be expected 100 new homes built by HUD. With the mutual help homes, residents are responsible for their own maintenance. With the low-rent homes, the residents must place their house on a maintenance list to request a member of the HUD maintenance team to repair their problem. Many of these problems get overlooked due to the small budget for maintenance, and the small maintenance

cycle of abandoning the old and building new. Because there is little government support for maintaining or remodeling many families find it difficult to keep their houses in good condition. There is also little ambition when you know you can simply put your name on the list and apply for a new home in a few years. The government wastes thousands of dollars each year in funding new homes instead of investing in research, remodeling, and better materials to reduce the frequency of rebuilding.





Images from left to right:

1. Mobile home located in the immediate area of Winnebago.
2. Brick two story home with siding build in 1991. This house has been abandoned for weeks, however the exterior lights remain on.
3. 1985 vinyl siding house located in the outskirts of town.
4. Brick house showing neglected back yard, and uninviting transition space.







Images from left to right:

1. Brick house, large gable roof not facing the street. This image shows lack of connection with the landscape, and no indoor/outdoor space to enjoy.
2. Image showing lean-to car port. Hand made, yet cars still end up in yard. This shows lack of interest in maintaining a yard, as well as the need for separation from parking spaces and recreational spaces.
3. This image shows the poor transition

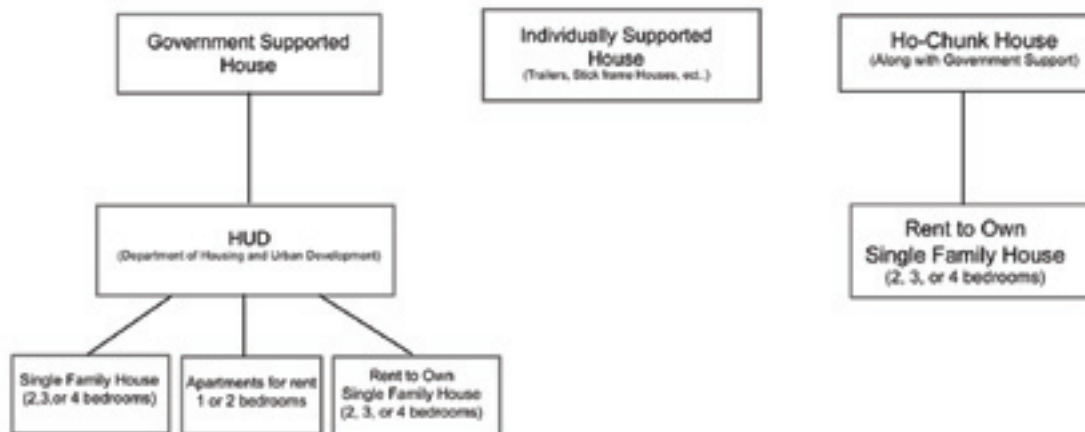
from interior and exterior spaces. 4. This house built in 1985 struggles to maintain itself with its cheap construction. Also notice the air conditioning units crammed into the windows, as well as the neglected lawn. All four of these images highlight the need for the vehicle to be near the home.





## Current Solutions

Three changes have made an impact on the tribes housing market: one in 1950, one in 1974, and one in 2003. Before 1950, the tribal members had two options for housing; one was to buy or build their own house with no government support, or utilize government support and rent a single-family house. If a family chose to receive government funding for a house they would first have to place their name on a list and wait until there was a house available. Then they would rent the house based off their gross annual income. It is not uncommon to have the monthly payment be negative,



in which case the resident pays nothing towards the rental of the house. This system leaves very little room for ambition, and no room for respect of the home. In 1974, congress passed a law that allowed government funded housing to be owned after a period of renting. This allowed families to invest in their houses for future generations, rather than just endlessly putting money into a hole. They hoped that this policy change would help increase the sense of pride and ownership in the houses, however the government made no attempt to individualize the houses or include the owners in the design process.

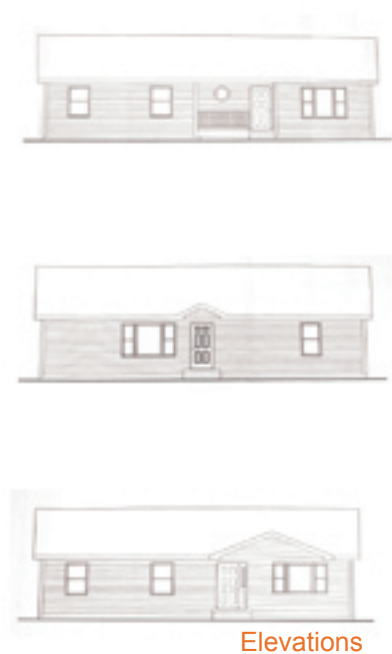
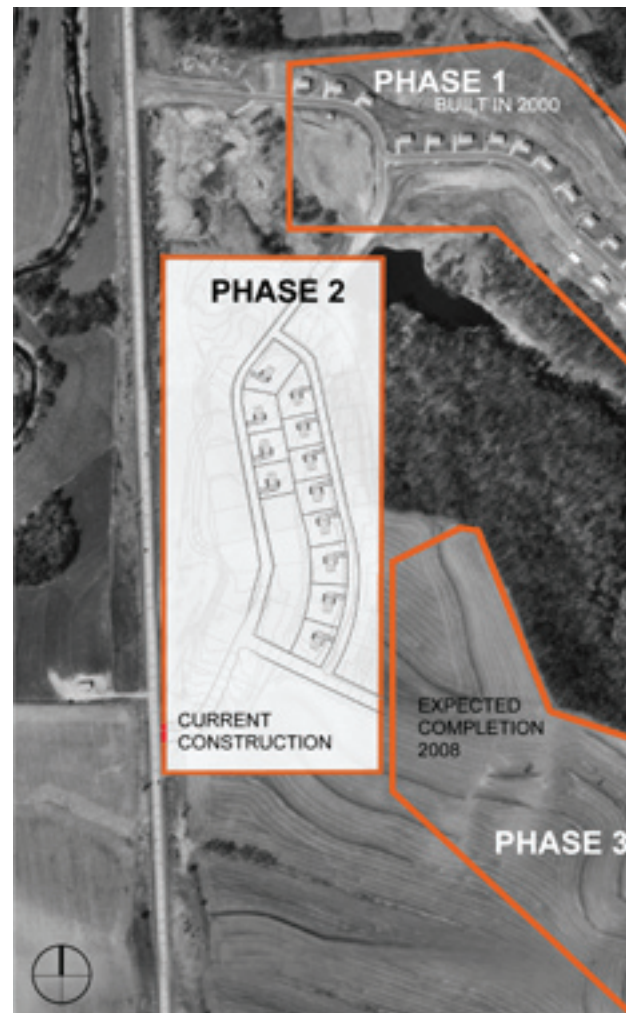
Today the same system that was used in 1974 is still used. The most current developments are located just outside of town, one is through HUD, and the other is through a new company called Ho-Chunk. Much of the analysis for this project was based of these two recent developments because of the assumption that

the newest housing should be an improvement from the other housing models.



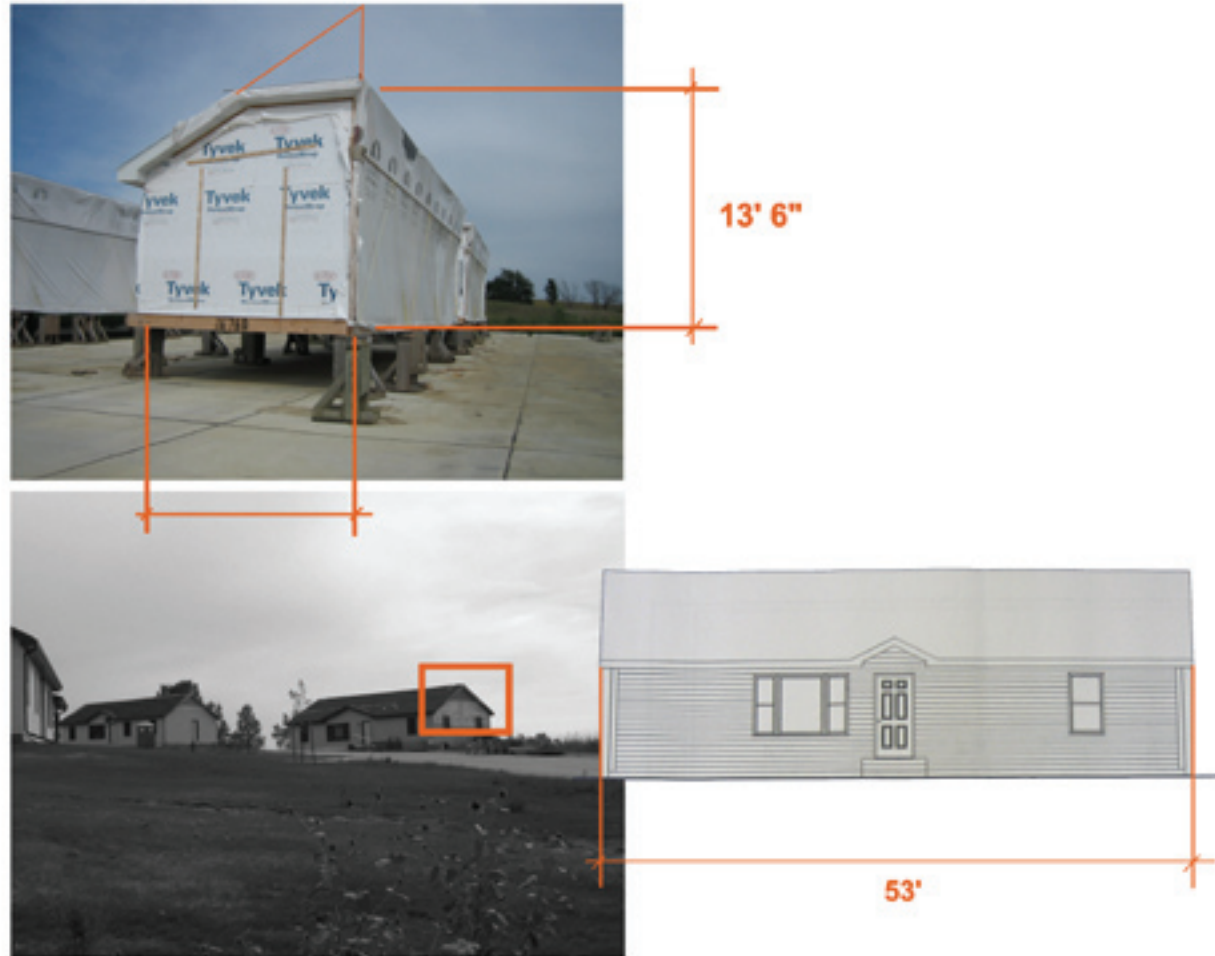
## HUD Development

The development to the south of town was build through HUD. It is a work in process that began in 2000, and is expected to be completed in 2009. Today most of the infrastructure has been completed but the housing for the last phase (out of three phases) will be built later. The houses are all similar in size, single story, with an attached carport to the side. The houses currently built offer three types of floor plans. Two floor plans are very similar with three bedrooms and two bathrooms, a living room, kitchen, and dining area. The only difference between them is the layout of the closets, and the laundry room. The other option is a four bedroom with the living areas in between them. The site plan is designed with economy in mind, keeping the houses lined up close together to minimize infrastructure costs. There is very little connection with the ground, the buildings seem as if they were just sat on top of the ground as soon as they arrived from the factory with little or no landscaping done to the site.





## HUD HOUSE



Images from left to right: 1. Back yards of houses seem unprotected and un-used. 2. Streets are open and seem empty with the lack of planted trees. The attached ramp on the closest house shows the markings of which house has a handicapped resident. 3. Houses appear plopped onto the landscape from above, there is no attention paid to environmental orientation.



4. The design of the exterior spaces does not promote exterior activities. The garage/carport creates problems with exterior storage, and protection from wind and other weather concerns.



### Ho-Chunk Development

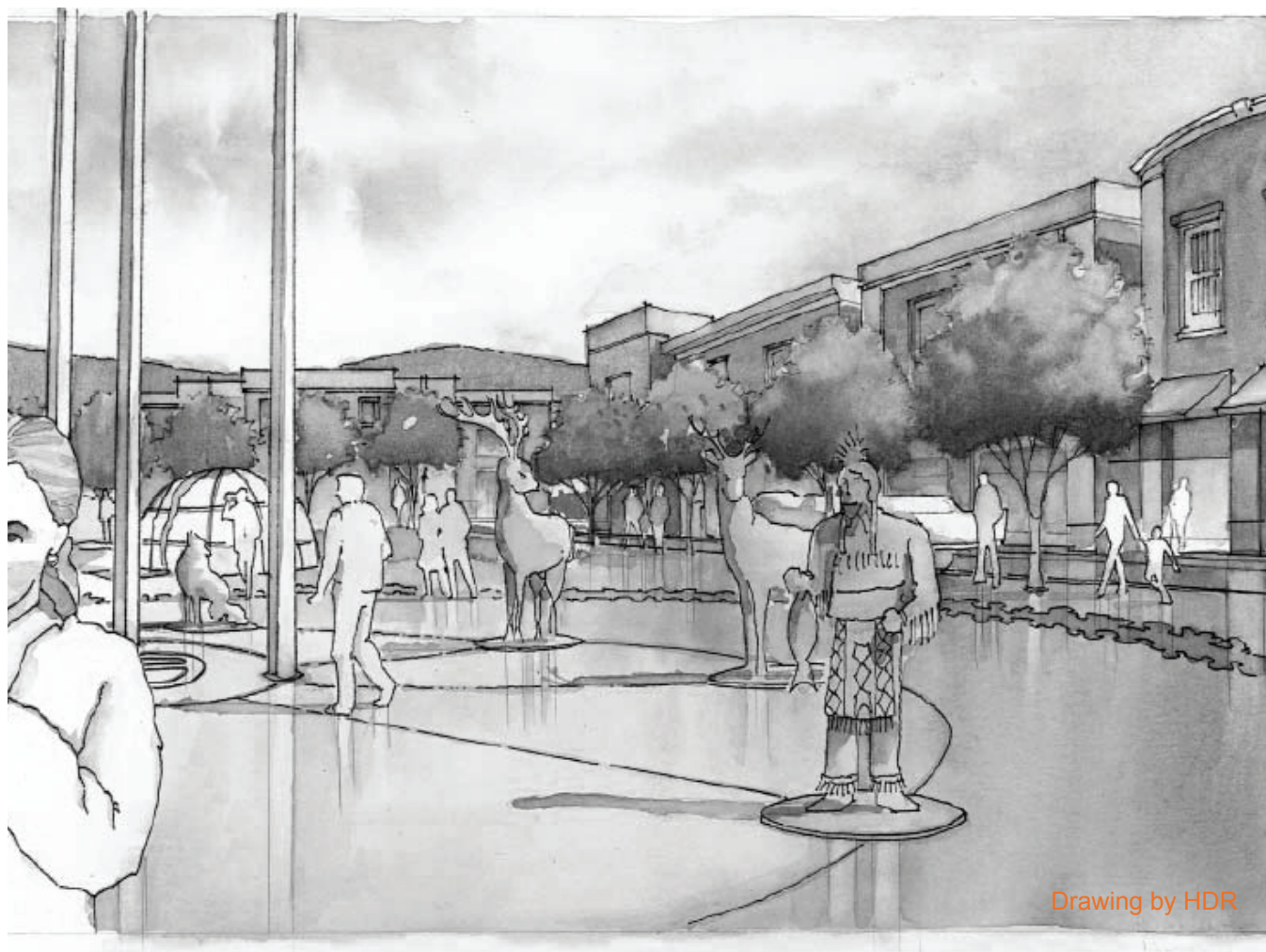
Ho-Chunk is a company owned by tribal members that works to raise money for the tribe through selling native products, tobacco, gasoline, and other products. Some of the profit is used to improve the housing options in Winnebago. The Ho-Chunk company is a partial owner of the Dynamic Homes company. Ho-Chunk rents the houses to residents using the rent - to - own policy. Dynamic Homes are pre-manufactured sectional modular houses that are built in Minneapolis and then trucked to Winnebago. There is no design or construction involvement with the owners of the house, minus picking out a floor plan from limited choice catalog.

The Ho-Chunk Development is to the North of the town. The land came up for sale, and the corporation began planning for a much needed residential development. In 2003, the Ho-Chunk Corporation (HCI) hired an

architecture firm out of Omaha, Nebraska, HDR, to design a plan for the new development. A team of ten professionals including HDR Planning, 180 degrees Design Studio, Opticos Design, and P. Knight Martorell worked with a group of local community members in a weeklong design Charrette, which led them to the creation of the design guidelines for the Ho-Chunk Village. The mission was to create a pedestrian-oriented village center for the residents of the community. HDR later completed a code that is meant to facilitate the development of the designed master plan (appendix).

In Diagram C we can see the proposed site plan for the development. The Light pink color indicates the streets that are currently built, and the dark pink indicates the buildings that are currently built. The rest of the development is currently under construction and is expected to be completed within the next 10 years. The site plan is designed with future growth in mind.







It is planned to create a feeling of a new town center, with a shopping area, and center community space. The design also attempts to address the problem of housing for the non-nuclear family. Those people who have no children, who are not married, or divorced, as well as the elderly. HDR introduces multi-use apartment building with commercial uses on the first level.

HDR's presentation of the project leaves much to be desired. With their ideas of putting the Winnebago's culture on display as if the people lived in a museum of their own culture. Image on page 35 shows the intended use of the courtyard space in the middle of the development decorated with life size statues of Natives in their traditional costumes, as well as a mock up of the historical wigwam.

The Dynamic Homes company offers several options for floor plans, however only three or four floor plans fall



Diagram C

within their expected budget. The houses are slightly larger than the HUD houses, some with a complete basement as well as a fully enclosed garage. The houses are slightly more expensive, but many of the residents feel that its worth it because they will live in the house their entire life. The space layout of the homes is very similar to the HUD homes but they are less identifiable from the street as a “trailer home” due to the addition of the garage.



Drawings by HDR





Images from left to right: 1. The current development of the new "Town Center." Only the Dollar General, and two office buildings have been completed. 2. Construction of a new Dynamic Home. The garage is built completely on-site, while the house is shipped in two sections from Minnesota. 3. Completed house, looking from the street. This house has been vacant for 1 year because the rental price

is too high for most Winnebago residents. 4. Interior of same house. Kitchen utilities must be provided by resident.





After examining the two new housing developments from an outsider's perspective, I went to individual families who live in the new developments to get their perspective. This was one of the most important resources for my project. Some of the information I gathered using interviews that I gave to the "head of the family" to fill out, and some of the information I have gathered from just visiting their homes and talking with them (interview questions located in appendix). I conducted these visits over four separate visits to Winnebago. I have also kept in mind my experiences from growing up in the area and visiting my native friends' houses as a guest, opposed to an interviewer.



## Site Plan and Community Facilities

### **Individual lots**

There are many problems with the site plans that have been designed for the new developments. One particular thing is the fact that the land is divided up into single family lots, with single family houses on each lot and clear boundaries showing that there are separations between property owners. There are strict borders laid out for who owns what part of the land and where one can put a fence up and one cannot. This contradicts what Winnebago people think. They see their reservation as a place for everyone in the community to share. Their lawn becomes a place for not only their own children to play, but all children in the community. The Winnebago also do not share the same ideals about mowing grass as the majority of the U.S. They feel that the land should be natural,

and left the way nature intended. The current site plans give each house a large front lawn that looks unattained if un-mowed. The site plan should be designed to create a more natural landscape that does not require mowing grass.

### **Picnic Facilities**

The layout of both the new developments and the older residential areas show no sensitivity toward the Winnebago custom of large family dinners. The site plan does not include various picnic locations, or outdoor eating spaces next to the family homes. There is one such facility in the town; however, its location is next to a high voltage power location, and the train tracks. It is also on the edge of town, across the highway from all the residential areas.

Images from left to right: 1. Picnic facility located near a power facility, and adjacent to railroad tracks. This shows the typical population at the site, which is usually empty. 2. Example of aperture used for a air conditioning unit. This image also shows the lack of pride and ownership through the maintenance of the house.



## Building Systems and Construction

### **Sense of Ownership**

As mentioned earlier, the residential environment in the Winnebago reservation seems to be poorly maintained. With a quick observation of the reservation one can see that the houses, and yards are not kept up to a level of standard as the rest of the common residential areas of Midwest. For years the renters of the homes felt no sense of ownership, they were practically given the homes, with little work or money loss on their side. They were never taught the skills needed to maintain their home in the same condition it was when they moved in, and they didn't feel a loss if their house was damaged. One change that has helped turn this around is the possibility of ownership. As mentioned earlier, in 1974, HUD sponsored programs that allowed Natives to own in their home after a period of payments. This gave the families a sense of ownership, and purpose for

maintaining their home. This however does not solve all their problems, they still do not have the basic skills to maintain their home, or the money to renovate or upgrade materials, finishes, house ware, etc. Another problem associated with ownership is the ability to be involved with the design and layout of their home. Currently they only have a few options to choose from, picking out a floor plan from three different (yet very similar) choices hardly constitutes having options.

### **Efficient Living**

Another mismatch is the heating and air conditioning units. Most of the houses that are available for the tribe include an expensive central air unit. This seems like a good idea, however many tribal members cannot afford to run their systems. The air conditioners are rarely turned on, and in the winter, many families are left cold. Some older houses are not equipped with air conditioners, thus families are forced to use



window units, which are not energy efficient, and also reduce the operability of the windows.

### **Cost Efficiency**

The homes built for the reservation today are all pre-manufactured modular homes. This makes sense due to the high labor costs of today; however, the company that Ho-Chunk purchases their houses from is from Dynamic Homes of Minnesota. It is an additional cost of 1,700 just to ship the house from its manufacturing site to its assembly site in Winnebago.

### **Space Allocation**

#### **Indoor /outdoor space**

There are many problems with the sizes of space within and around the houses. The current houses do not provide adequate interior-exterior space to enjoy. Many Winnebago members feel that it is important to be connected with nature, and a good place to absorb

nature is through using an indoor/outdoor space like a deck or a porch. However, the porches offered with many of the homes are inadequate in size and sun protection. The HUD houses offer porches that are only three feet wide, barely wide enough to sit in a chair. This small porch serves as an attractive decoration for the entrance; however, it does not satisfy the need for an indoor-outdoor space. It is uncomfortable to sit in a chair in the space, but it seems to be the perfect place for children to stash their outdoor toys.

### **Dinning Area**

The dining area is a very important space in the Winnebago's home. The custom of having large extended family dinners is difficult with the size and layout of the current housing options dinning areas. In diagram \_ we can see an example of one family's solution to the small dining area. This family simply placed additional tables in the other areas of the

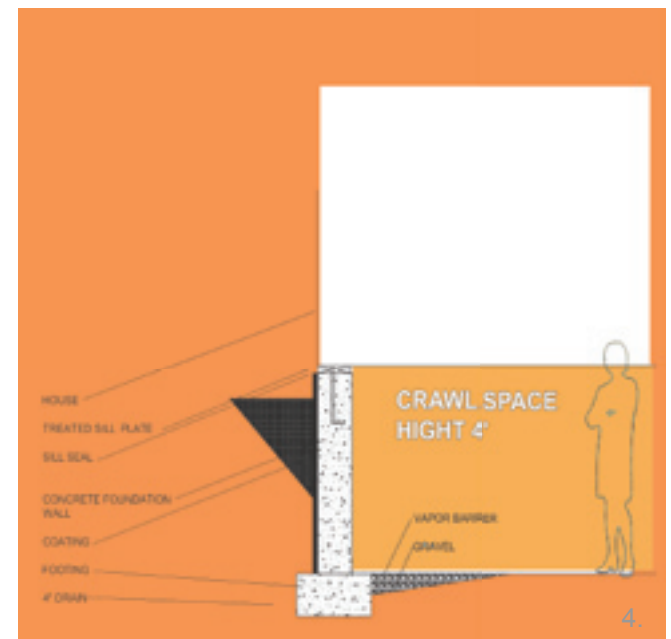
Images from left to right. 1. Front porch of a HUD house. Usually collects more junk and toys than is used for a space to relax in. Because it is a space right next to the door it is convenient to place piles of shoes or other temporary items. 2. Image of an older house in Winnebago. This shows the absence of an indoor /outdoor space. 3. Floor plan of a Ho-



Chunk home showing the table arrangement for a typical family dinner. The group that must sit in the living room is disconnected from the others in the kitchen. I went to many houses and saw many variations of this, even an extreme situation of a table in one of the bedrooms. 4. Section of a HUD home showing the strange, unused storage space that is 4' tall.



3.



home to satisfy their needs. This seemed to work for the family, however it made it difficult to navigate around the extra tables and chairs especially during dinnertime when people were seated at the tables.

### **Storage**

In any home a common complaint is that there is never enough storage. However, on the Winnebago reservation this statement is extremely valid. There are two major problems that the Winnebago must face when it comes to storage. One is that there is no space inside the house to store large items, and the other is that there is no space outside the house to store large items. The HUD houses provide a crawl space under the house for this purpose (as well as maintenance and storm shelter purposes) however the door to the space is too small, and hard to use. Located in the hallway or in the Laundry room is a small (2'-6"x 3') door cut out of the floor. It opens by

pulling on a handle and the entire door comes off. There are no steps, and no ladder to help one get into the space. Two women that I talked to about the crawl space were extremely worried about being able to get in or out the door in the event of a tornado. Other people were frustrated with the size of the door because they couldn't get large items through it. The homes with carports are missing a place to lock up their valuables such as lawn mowers, bikes, and grills. They feel that if there wasn't enough money in the budget for a full garage they should at least have been given the option to have an exterior storage building or an exterior closet next to the garage. One family found a solution to this problem by placing items on their roof, this way it was more difficult for people to steal their stuff, rather than leave it on the lawn.

Space Flexibility

### **Changing Needs**

Because of the shortage of homes, and the small housing market for buying and selling, a family who owns a home on the reservation will most likely live there for their entire life. This causes a problem when a family grows or shrinks over time. A child may move out to go to college; a grandmother might move in, an unexpected baby might be born. Many changes in a family's size may make it difficult to stay in one house. One family found that their only option was to set up a tent in the back yard to relieve them from their crowded circumstance. In other communities when this happens it is easier to move out of a house and into another in the same neighborhood. If a family suddenly shrinks to the size of one, the only option is to move down to the center of town where there are apartment buildings just for singles. This creates a feeling of punishment for those who do not have a large family.

### **Light and Shade**

#### **Vandalism**

The community has had problems with keeping exterior lighting due to vandalism. Teens find it amusing in the neighborhood to shoot the light bulbs out at night, or throw rocks at them until they break. Because of this there are no exterior lights installed in the new developments. This creates an even greater problem for the families, when the sun goes down it is difficult to see, and easy for criminals to get away with vandalism. There are other possible solutions to this problem but the current residential developments are ignoring other options.

#### **Native Blankets**

Inside the houses, it is common for Winnebago to use native blankets for curtains rather than blinds, shades, or curtains on rods. This is an interesting transformation of a tradition from when the tribe lived

in teepee's. It was common for the families to decorate the interior walls of the teepees and wigwams with their own hand made blankets; this was an act of beautification, as well as insulation. Today, the blankets are nailed and tacked to the walls above the windows. This makes it difficult to adjust the amount of light throughout the day, so usually the blankets stay down all throughout the day.



Images from left to right. 1. Interior of carport attached to a HUD home. The woman living at this house said she planned on building a fence around the carport before winter to protect from winds and snow. 2. Image showing tent in back yard of a crowded house. 3. Image showing Native blanket hung in window for sun protection.







## Cultural Precedents

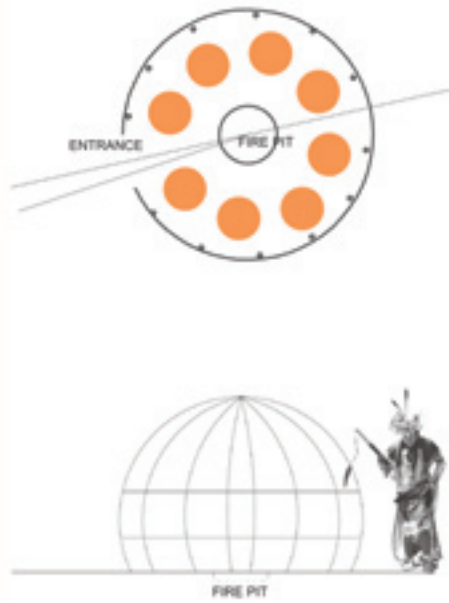
Historically, all traditional Native design, whether clothing, ceramics, ritual objects, or architecture, provided a sense of place and unity within the Indian community. Basic architectural design decisions, such as building orientation, configuration, or selection of building materials were typically driven by practical needs and cultural beliefs. The characteristics of Native American Architecture embraced the very identity of the people who created it and served as a visual reminder of their community values.

There are two types of ceremonies that the Winnebago still participate in one is the powwow, the other is the sweat lodge ceremony. The powwow happens once a year during the first full moon of august. The sweat lodge ceremony occurs more regularly.

The sweat lodge ceremony is conducted for two different purposes. One is to cleanse the body and draw out illnesses. The other is for spiritual relations and drawing out demons. The sweat lodges are built in many locations; the sweat lodges that are used for cleansing and illness removal are sometimes built right in the back yard of a home, while the sweat lodges for spiritual ceremonies are usually in more private (and sometimes more permanent) locations. Two or three families use the cleansing sweat lodges, where as many as five or six families will share the spiritual ceremony sweat lodges. Males and females

do not participate in the sweat together.

Many sweats start with all the participants fasting for an entire day, and during that entire day avoiding caffeine, alcohol, or other potentially altering substances. This should be a day of contemplation, in preparation for the sweat. Both types of sweats usually start with cleansing the skin, and passing sage smoke over the body before entering the lodge. Inside the lodge the fire tender puts seven rocks (burning hot) in the small hole of the lodge, using a bucket of water the tender will sprinkle the rocks to produce steam. In a traditional sweat, there is more guided prayer, chanting, and drumming. Some sweats are done in complete silence. Each round lasts around 45 minutes or so, and afterward the door is opened, and the fire tender puts 5 more rocks in. Sweats are sometimes done completely naked, but other times participants will wear shorts, or a towel.

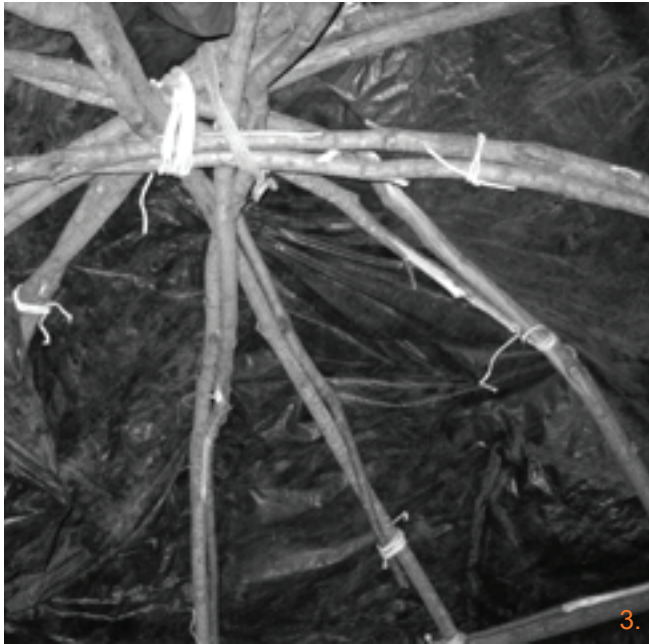


1.



Images from left to right: 1. Floor plan and section of the sweat lodge structure. Orange circles represent people sitting around the firepit. 2. Site plan of the sweat lodge that I visited in the woods near Winnebago. The Orange area represents the thick wooded area that the sweat lodge was hidden in.





Images from left to right: 1. Ceremonial sweat lodge, from entrance point in wooded area. 2. View showing rock piles, and branch curving. 3. Interior of sweat lodge, looking up. This shows the use plastic tarp instead of the traditional animal hides or cloth canvas. 4. Structure of a sweat lodge behind a Winnebago house.

The powwow grounds are located to the west of town slightly off HWY 75. A sacred place that gets used once a year. The grounds are left for nature to take over the rest of the year the place is deserted, the buildings are locked up and boarded shut. Just before the powwow, tribal members come to prepare the site, mowing the grass, painting, and cleaning.

This is not considered a wasted space when it is not used because there is not a shortage of land in the area. Smaller powwows are sometimes held in the woods, behind homes, in the school gymnasium, or other more private areas.

The organization of the site is based on the cardinal directions as well as privacy. There are many levels of privacy, with the entrance to the south, being the most public, as you move north to the back becoming extremely private. Outsiders are not allowed into the

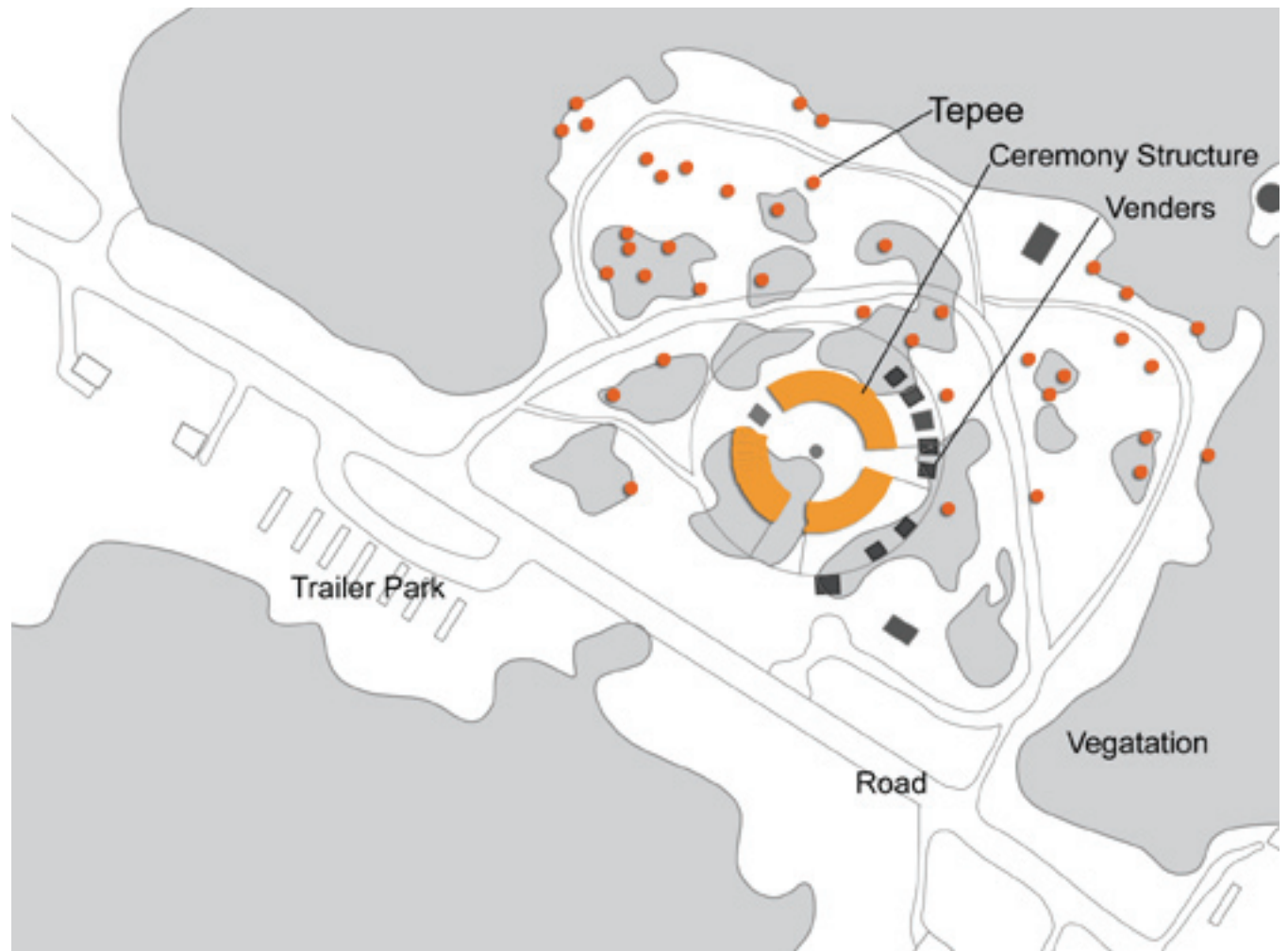
camping area, this is made clear from the entrance to the grounds, by a man taking money, and by signs nailed to trees that say tribal members only. The arena is a circular grassy area with a set of bleachers enclosing it. There are three main openings to the arena one to the east, one to the south, and one to the west. The west side of the bleachers does not have a canopy, or shade, so it lets a lot of light into the arena in the evening.

Just outside the arena to the south and southwest are vendors for selling native goods. The products being sold range from t-shirts, leather moccasins, turquoise jewelry, dream catchers, beaded items such as belts, bracelets, and barrettes. Other items being sold are native blankets and shawls, clothing made from animal hides, weapons made with carving rocks and stones, and CD's of native music. The food vendors are clustered around the arena to the east. The common foods sold during the powwow are all authentic Indian



foods such as Indian tacos, Indian burgers, Indian fry bread with beans, and a soup that has corn, fry bread, and beans.

To the North of the arena are the camping sites. Many families stay at the powwow grounds during the ceremony week even though they might not live far away. Some people travel long distances to join the powwow, the only place to stay for them is to camp out on the powwow grounds. This part of the ceremony and fun to sleep with everyone else. Also the dancing sometimes

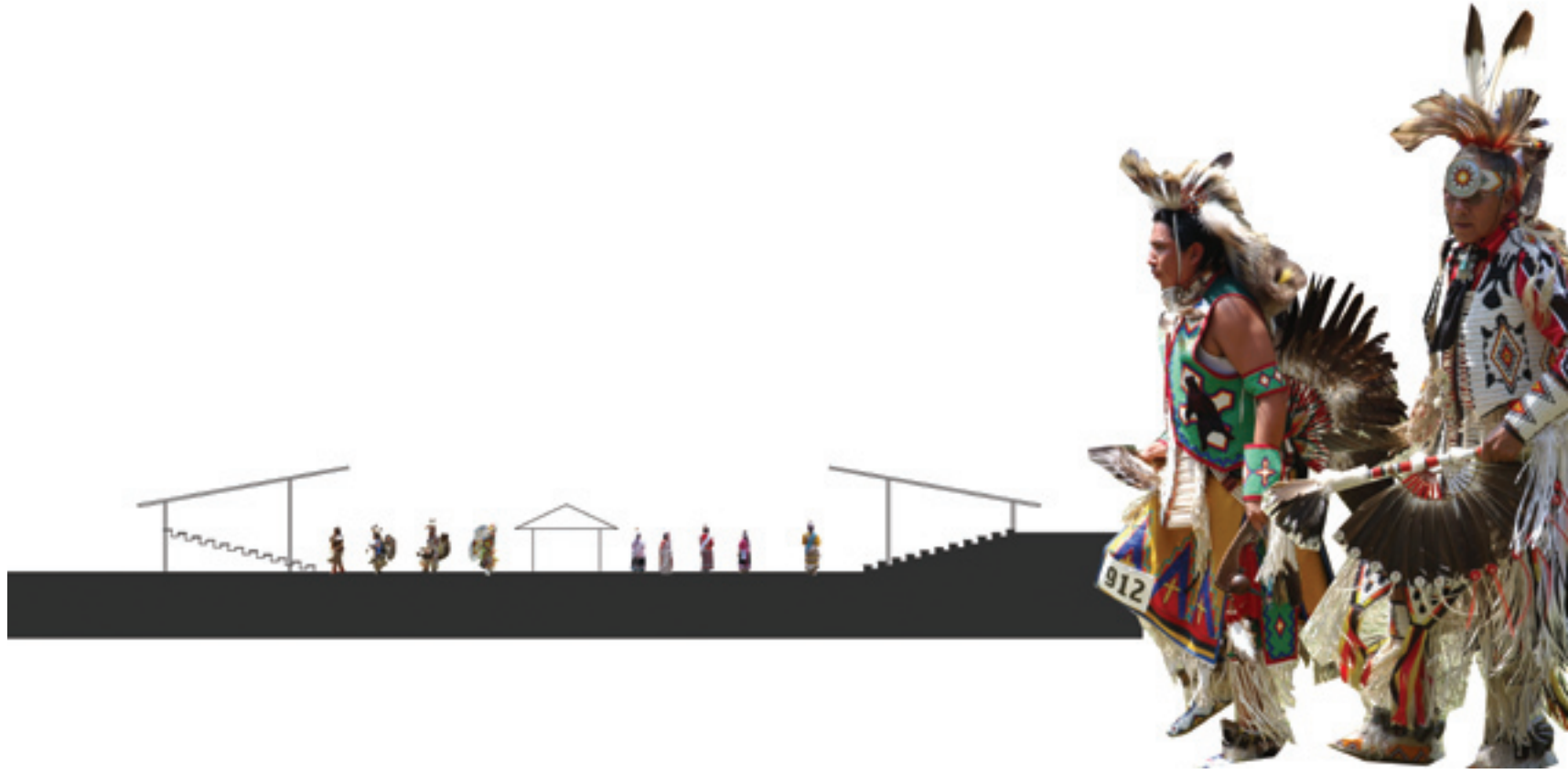


lasts most of the night, so it is common for some people to go off to sleep while some stay and dance. There is one structure to the north that houses a bathroom and shower facility. The camping structures that individual families set up range from authentic teepees that might be hundreds of years old, made from buffalo hides, to teepees made from synthetic material and canvases, to the common plastic tent from Wal-Mart.

The grand entrance happens two times a day, one time at around 1:00 pm, and one at 7:00 pm. This is where everyone involved in the dancing comes into the arena at once. There are prayers said at this time, and special announcements, and other considerations. The grand entry always starts from the opening to the east. The dancers move very slowly in and around the circle in a clockwise rotation until everyone has joined the circle.

Material Culture







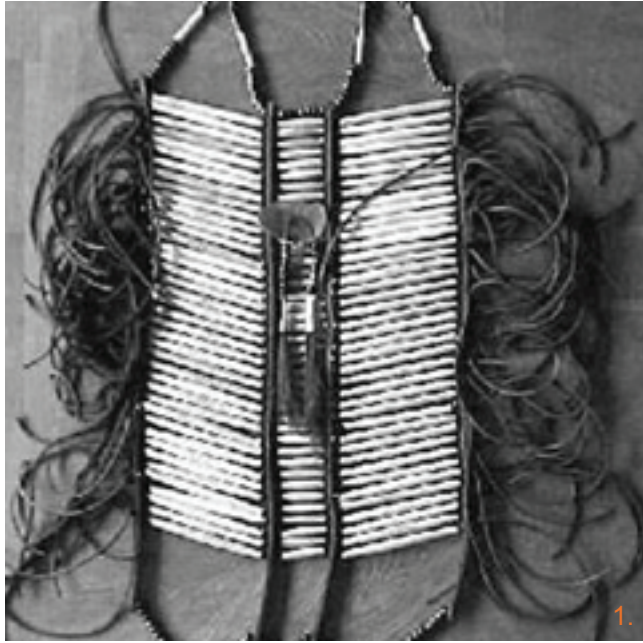
Images from left to right: 1. Image of Winnebago Indian in traditional dress. 2. Three Dancers participating in annual competition in the Fancy Dance Category. 3. Empty pow wow grounds. 4. Area to the Southwest of ceremonial structure, this shows the dense trees that the area is hidden in.







It is important to look at historical artifacts made by the Winnebago to see some of the repetitions in methodologies. One important tradition the Winnebago partake in is beadwork. Beadwork was the most common form of decorating clothing, and other items, giving the items color and vibrancy. The traditional way to make beadwork is to use a beading loom. This mechanism stretches the thread in parallel lines which creates the underlying structure to create the designs. Then the beads are threaded through the transverse direction, the colors are changed to create the patterns.



Images from left to right: 1. Winnebago chest garment made with leather, bones, and beads. 2. Beaded belts





## Architectural Precedents

With all the construction technologies available today it is important to choose the right techniques for the tribe. To simplify the research the architectural precedents are broken down into categories based on specific requirements for the project: community involvement, environmental design, flexibility (modular), and general design.





### Community Involvement

For community involvement precedents I looked at many organizations throughout the United States and Canada that worked with tribes to develop their communities. Two examples worth noting are the Red Feather Development Group and the Seabird Nation Development. The Red Feather Group is a non-profit non-religious group dedicated to reconstruct damaged homes as well as build new ones on reservations. In 1994, Robert Young first organized a group in the Pine Ridge reservation in North Dakota to help a woman by the name of Katherine Red Feather. With the success of the development of this home, the organization was born. They have currently finished Thirty-Three housing projects including two straw bale homes. The straw bale homes were chosen over stick frame construction because of its durability, low cost, high insulation

values, and the fact that straw is readily available in most areas of the country. The organization would like to see a program such as theirs, using the concepts of affordable, sustainable, and environmentally friendly housing spread to all tribes in the nation.

The Seabird Island First Nation Project is based in Canada, but has very similar goals as the Red Feather Group. They have developed a series of multi-family homes and that acknowledge the culture of the First Nations people as well as offering them the latest concepts in housing construction and design. They use basic concepts of sustainable planning, (using wind solar and earth energy to save on heating and lighting) Durability, (use of high quality materials) affordability, (using modular construction) and flexibility (using flexible floor plans and barrier free designs to accommodate the changing needs of families).



Images from left to right: 1. Robert Young-founder of Red Feather Group. 2. Volunteers working on house for Katrina Red Feather. 3. Straw bales installed, ready for stucco application. 4. Local artist designs interior clay mosaic design.

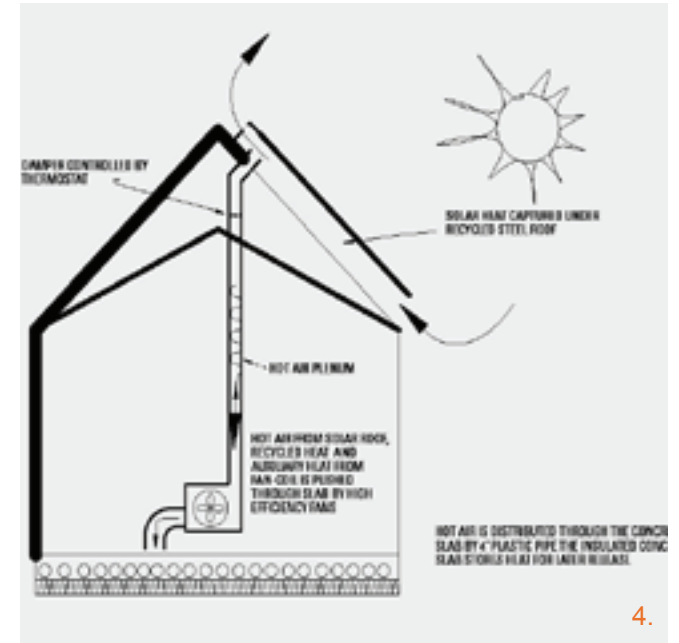






Images from left to right:

1. Front door of single housing unit.
2. and 3. Image showing building set into the mountainous landscape. The peaks of the houses work well to shed the large amount of snowfall they receive each year.
4. Section diagram of housing unit showing energy uses.







## Environmental Design

There are many technologies available today that can help reduce the energy use of a building. The main goals that will be initially considered will be the use of straw bale construction and the concept of a passive house. Straw bale construction will aid in the community involvement aspect of the project as well as the insulation qualities of the building. Using a straw bale wall on the north side of the building with few openings will keep much of the heat from escaping during the cold winter months.

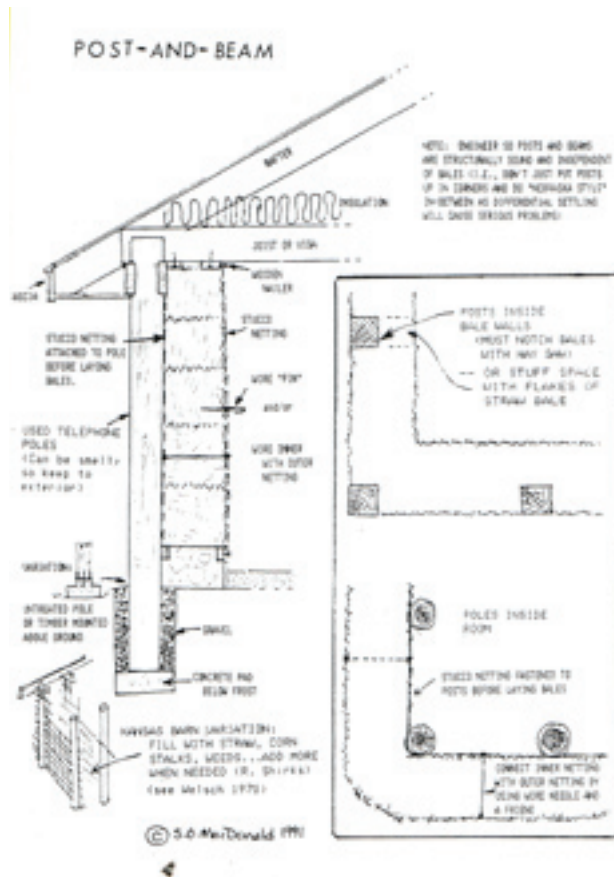
Building with grass and straw packed in mud for mortar has been around for many centuries. It wasn't till the 1800's, with the invention of the baler, that the straw bale houses emerged. Experimentation began in the Sand Hills region in Northwestern Nebraska. Straw was used to build temporary homes, barns, and churches.

Soon the immigrants of Nebraska discovered that the structures were durable and comfortable in hot and cold weather. The homeowners then stuccoed the interior and exteriors and made the homes permanent structures. As the railroad expanded into the region, milled lumber came too. It was not long before the straw bale house was replaced with conventional building techniques (<http://www.unm.edu/~abqteach/southvalley/01-06-05.htm>).

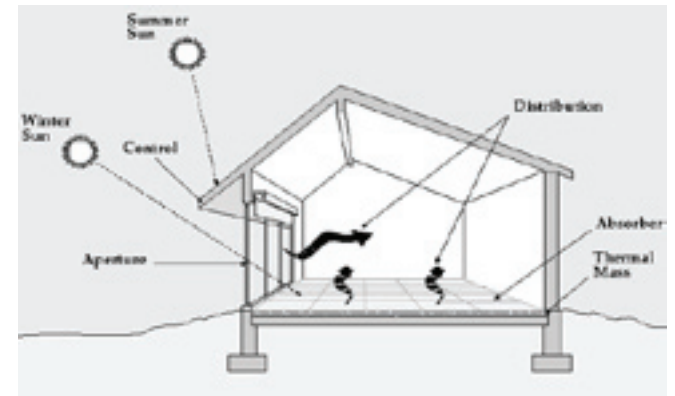
Price per square foot can range from \$5 (owner built; mainly using recycled products) to over \$80 (contractor built; depending on how customized you make the home). According to Daniel Chiras, straw bale homes are three to four times more energy efficient than conventional brick homes. The average R-value per inch for straw bale is 2.7. The R-value for a three-string bale (24 inches wide) is 54.7. A two-string bale (18

inches wide) has an R-value of 42.8. The compression strength of straw bales is 10,000 pounds per square foot. A typical 2x4 wood wall has a compression strength of 1,500 pounds per square foot. Before buying bales for a home, make sure they are baled with a compression setting between 250 and 500 pounds. A dry density of 7 to 10 pounds per cubic foot is recommended. Straw bales do not burn easily due to the lack of oxygen. With an added protective coat of plaster the walls become virtually fireproof.

Two types of walls can be constructed using straw: load bearing and non-load-bearing (fill-in). In a load-bearing wall the straw bales are stacked like bricks. The bales are pinned together with rebar. The bales support the roof and provide insulation. The fill-in technique (non-load-bearing) uses posts and beams to create a frame. The straw bales are placed in between the posts and provide insulation (Roaf p.63-64).



A Passive House is a building that uses typically 75 to 100% less energy for space heating than current new buildings that meet today's U.S. energy efficiency codes. A passive house could also be in the category of a Super-insulated building. Passive houses require no separate central heating system, except for a domestic hot water heater or boiler. A passive house makes extensive use of its intrinsic heat from internal sources such as waste heat from electrical devices, and body heat from people and animals inside the building. A passive house utilizes direct solar gain, and stores the heat for use during the coldest part of the day. Passive houses typically use high levels of insulation, super insulated windows and high R-Value materials for exterior walls. Passive house can be constructed from lightweight or dense materials, usually using an internal thermal mass to reduce summer high temperatures, and increase winter low temperatures.



## Flexibility and Modular Design

The use of modular construction will help to keep the construction costs at a minimum as well as increase the flexibility and personalization of individual houses. There are many types of modular construction including:

- Sectionals- applies to a family of boxes of cubes which when joined together at the job site form a completed structural unit. Typically fabricated in half house sections which may vary in width from 10 to 14 feet and length between 38 and 56 feet. The individual sections leaving the factory are completely finished with flooring carpeting painting, building systems, etc. Usually requires a low sloped roof to follow shipping height limitations.
- Sectional box- a sectional house without its factory installed roof system. A separate roof

system allows for larger ceiling height, and more commonly employed for two story single family units.

- Three Dimensional- this system is similar to the sectionals in its cubic or box-like shape, it is generally smaller, and a greater number would be required to complete the same building unit. Each component is pre-finished, pre-wired, pre-plumbed etc...
- Manufactured (prefabricated flat pack)- A packaged or manufactured home composed for the most part, of flat components which are incomplete in that final finishes have not been applied prior to delivery to the building site. Wiring, plumbing and related mechanical work is not necessarily included in the factory process, but added at the building site. The intent is to reduce

on site construction time by including all items required to erect the structure in the package. They are loaded on the truck in a designed order in that the building can be constructed as its parts are unloaded.

- Components- Individual components are used to construct the home come from different sources. Components are generally thought of in terms of structural items such as trussed rafters, wall panels, floor panels, window systems, etc.
- Fold outs- fabricated in such a way that the side walls, floors, and end walls hinge out from a center core to increase the size of the home, usually used for mobile homes.
- Utility Core-The utility core is a factory produced modular unit which contain all mechanical, electrical

and related systems. This project will utilize this idea by giving different options for bathrooms, kitchen facilities, laundry facilities, and mechanical room so they are easy to install, and easy to remove if necessary. This will increase the flexibility of the home over time and decrease the skills needed in initial construction.

(Reidelback, "Modular Housing in the Real")

While many of the modular typologies would be acceptable for this project, the flat pack modular system will be used for the interior walls. The flat pack system prevails in this case because it gives the most flexibility for unique house designs, as well as decrease the wasted space that occurs in modular systems that move air in its transportation.





Images from left to right: 1. Sectional house, showing the two halves being bolted together. 2. Three Dimensional system. 3. Flat pack design by Walter Gropius. 4. Components.







## Design Precedents

The most influential architects for my design process include Rick Joy, Craig Ellwood, and Mies van der Rohe. I also looked at other architects including many contemporary buildings from the Krinsky book however I felt most inspired by the three mentioned.

Craig Ellwood's work I found to be very sensitive and simple. I especially liked his ability to carry a room from the interior to the exterior. I appreciate Rick Joy's sensitivity of materiality. I found his use of concrete and steel to be very inspiring. I also appreciated his sensitivity to-

wards nature. His architecture studio in Arizona inspired the blurred boundaries I tried to create with the courtyard in my design. Mies's simplistic designs were also an inspiration for me. I especially looked at his apartments and houses designed with integrated courtyards.

I also researched many houses that have been built by HUD, that were actually designed for Native Americans rather than what they are currently using in Winnebago. Many of the designs HUD has used are just experimental, and are usually designed by students.

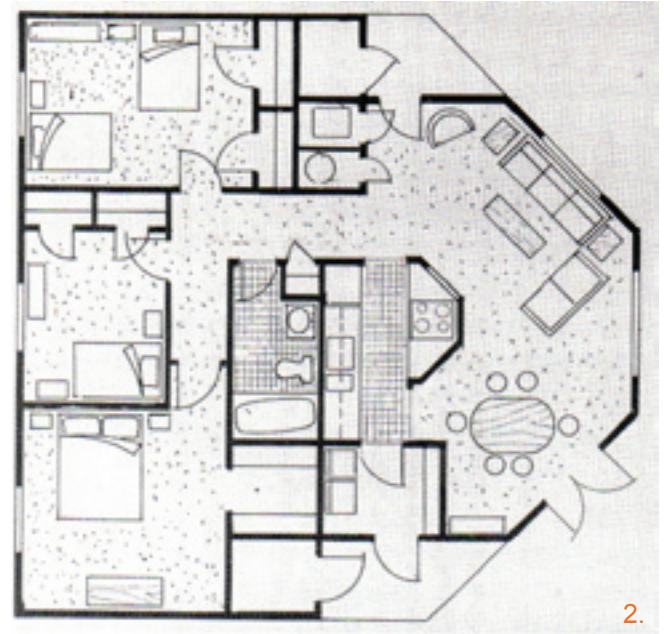
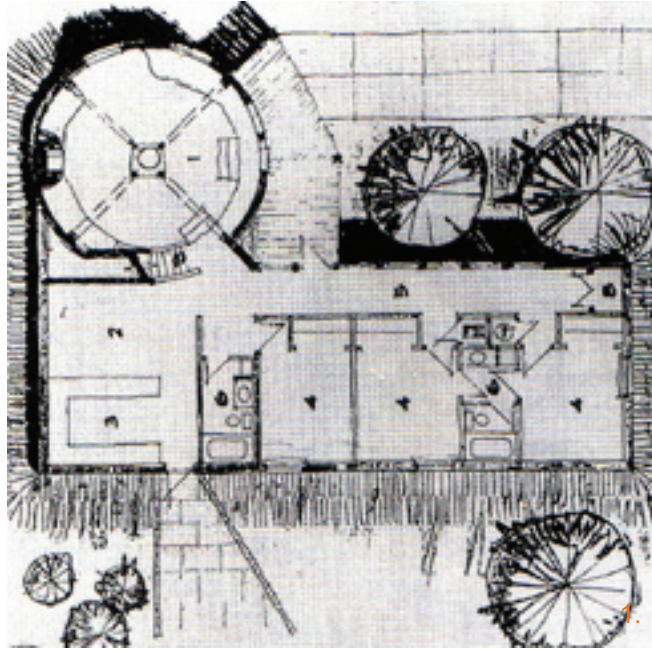




Images from left to right: 1. Rick Joy's studio courtyard. 2. Rick Joy's studio interior. 3. Rick Joy's studio courtyard at night. 4. Rick Joy's studio floor plan. This shows how small the actual courtyard space is. My design has a courtyard quite bigger than this, but I tried to keep it small to create the feeling of an outdoor room.

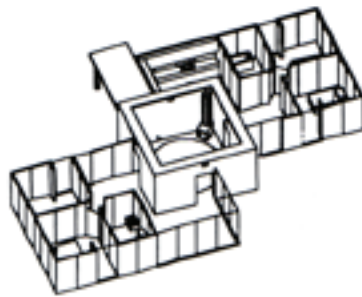
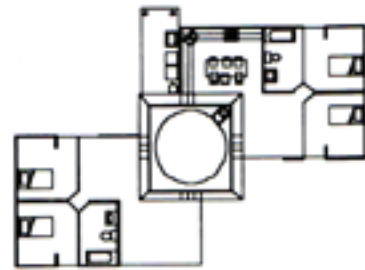




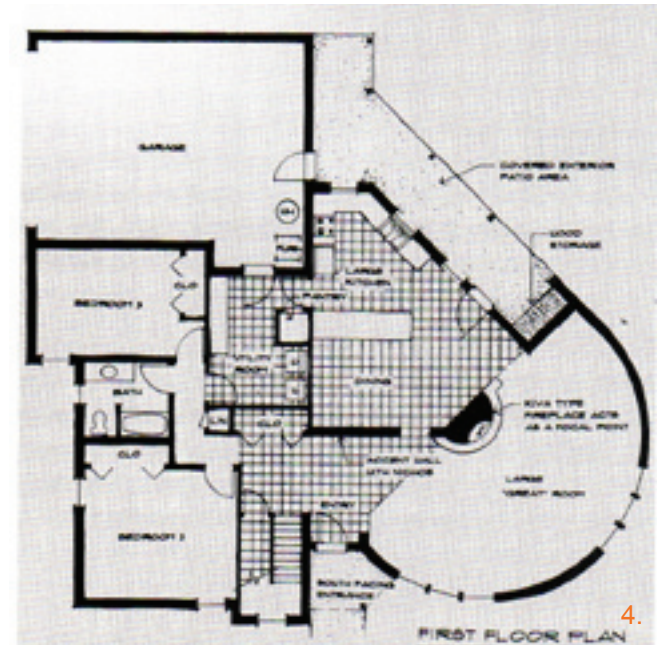




Images from left to right: 1. HUD house for Pueblos (proposal). 2. HUD house for Navaho. AICAE workshop. 3. Modular house for Navaho. Prototype plan 1992. 4. HUD house for Pueblos. AICAE, 1991. Walls are created with thick adobe.



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## Program Requirements

From the research investigation, the interviews, and the analysis of mismatches, I have developed a list of requirements that should be included in the design of the homes. This is not a typical program where the definition of spaces and sizes are determined. It is more important to describe what should be included in the design for specific spaces. Each house will include a bathroom units (the number and size yet to be determined), a living space, dining space, kitchen, and bedrooms (the number yet to be determined).



Category	Requirements
Exterior Requirements	
Trees/Bushes/Shrubbery	Plants should provide a sense of enclosure and protection around the house.
Lighting	Exterior lighting should use solar energy stored during daylight hours.
Garage/Carport	This should be flexible in size depending on families' car storage needs. If it is a carport, the space should have protection from snow, and a lockable space for storing large equipment or other objects such as bikes.
Dinning Area	There should be an exterior space where the family can have large dinners. Because the house will not be large enough for regular extended family dinners, there should be either a shared building for multiple families, and/or a space outside to shelter large dinners.
Building Orientation	The house should use the sunlight to its benefit, using sunlight to warm the
build	-ing during cold winter months, and appropriate shading for hot summer
months.	
Community Master Plan	It is also preferable for the tribe to have the entrance face the east.
Infrastructure	Houses should be clustered in small groups to utilize infrastructural amenities such as sewer, water, electricity, and roads.
Materials	
Construction	Materials for construction should be locally manufactured, and produced to diminish energy consumption and costs.
Finishes	Building finishes should be locally produced, as well as being durable. The



home	owner should be able to choose from a large variety of materials to individualize the home.
Flooring	The interior flooring should not be carpeted on the first floor. The material should be very natural, brining reference from the earth, very easy to maintain.
Lighting Exterior	Exterior lighting should use solar energy stored during daylight hours to safely light the areas surrounding the house.
Natural (windows)	Windows should primarily face the south to increase warmth through winter months. Overhangs should protect the windows for summer months. There should be natural light in every room of the house
Window Shades	Many Native families use their own family blankets for window coverings. There should be a rack above windows that allows this, and facilitates in the drawing of the blanket to let light in. There should also be an option for a built in shading system for those families who do not like putting blankets up.
Electric	Lighting should be available in each space of the house. Special attention to task lighting in kitchen, and office/or reading areas.
Storage Kitchen	Adequate cupboard space should be available. Cupboard doors should be large enough to handle extra large pots and pans. There should be a pantry like stor-age space, families often store larger amounts of food for their special dinners, and also they store more food because it takes so long to drive to town to buy groceries.
Bedrooms	Adequate closet space should be wide enough for hangers.
Hall/Living area	There should be a coat closet near front entrance, and/or entrance from garage.



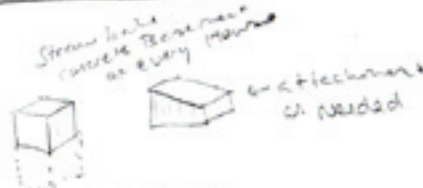


Large object Storage	There should be space, either outside, or inside to store large objects. This should be easily accessible. This space should include a space for the lawn mower and bikes. It can also consist of 2 separate spaces.
Basement/Foundation	The house should have some area that is below ground for tornado shelter. The foundation should be built according to freezing codes.
Accessibility	The house should be designed for people in wheelchairs, elderly, or other handi caps. There could be a optional unit that includes these features that appears similar to the other units.
Building Construction	Construction of the home must involve the community members and the owner. This will increase the owners skill levels In maintaining the home, increase sense of ownership, and decrease the initial costs of construction.
Interior Space layout	Interior spaces should be flexible so that families can use one space for many functions. This is to facilitate large indoor dinners, and the freedom to customize the home however they like.
HVAC Systems	The building systems should utilize green building techniques to help minimize the energy consumption of the house.

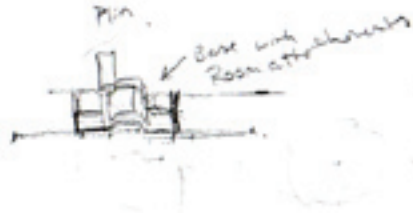




# House Construction



Single Family Base & existing core



Problem with having big Base should be? maybe you put a fire depending on your initial needs then add/shrink from there.



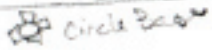
ability core with "slice" or separate



Houses would grow



individual house



only entrance to existing Center & through Houses.

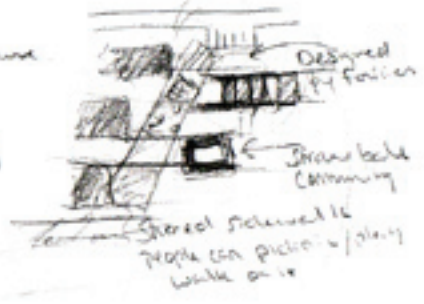
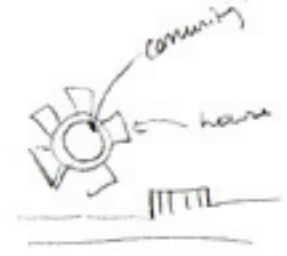


problems with growing & shrinking of houses.

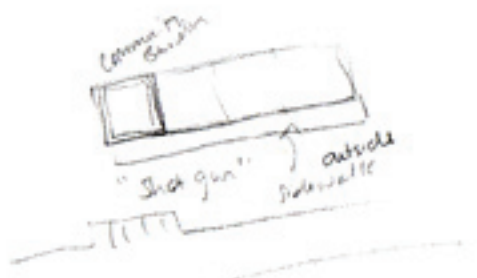


Houses would have no room vertically

## Site Plan



## Yoonerf



Because there are so many possibilities that could be suitable for this project, it is important to explore many options. I presented two initial ideas at the mid review during the first semester. The first option I chose to explore was the idea of using prefabricated cubes that could fit together in multiple combinations to create houses. Starting with the maximum dimensions allowable for transportation (53' long x 13' tall x 15' wide) I broke this size down into squares of 15' x 13' x 15' this created smaller units that would be easier to work with. Then I added extra pieces to give the design more options, and also included a utility core that housed a bathroom, kitchen facilities, mechanical units and sometimes a laundry facility. The connection with the ground used a concept that allowed the base unit of the house to sit on a

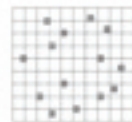
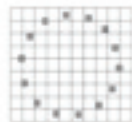
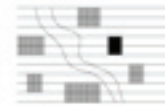
standard size basement, with the additional parts sitting on point foundations or piles. This allows the house to grow or shrink to whatever size it needed without harming the landscape.





The next idea that needed to be explored was how the individual houses related to each other. Because of the current problems of not having enough space to dine together in larger groups within the house I decided to make mini communities within the larger context that shared a building or at least a space outdoors where they could house these dinners. This space should not be too far away from the individual houses, to make cooking and moving food easier, it should also have the possibilities to have a shared kitchen or other shared facilities such as laundry, a shop, or even a game room. This would be a place that the mini community would be responsible for themselves and they could decide what amenities it would include and how much money and effort they chose to put into it. I took reference from

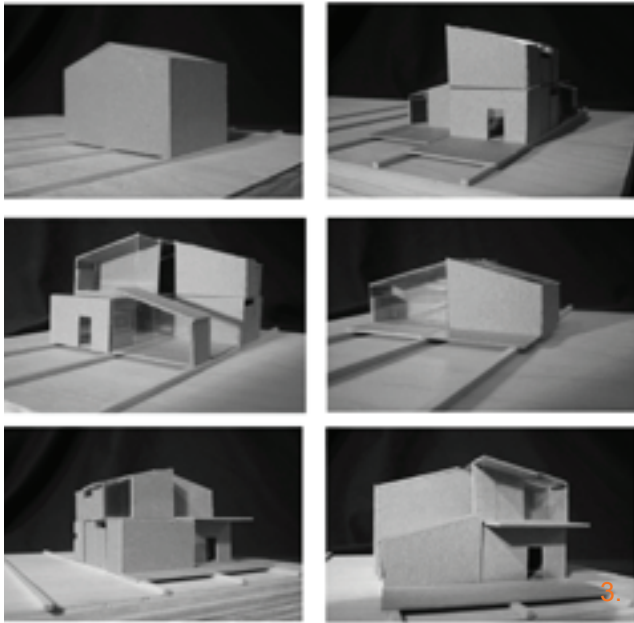
the tribe's material culture using their bead work as inspiration. Thinking of the structure of the bead work, I came up with an idea of using the lines of string, as a way to organize the housing. By taking a housing system that worked in slices, the structural grid would work in stripes. The mini communities could arrange themselves in any fashion they wished. I also focused on creating an inner sidewalk, or community space that they all shared. This space was meant to separate people from the vehicle. The house in this scheme was designed in a fashion that would allow the house to grow, or shrink over time. This enables the family member to stay in a home for their entire life. Each slice would be a separate prefabricated unit that the families could purchase, or return, as needed.



1.

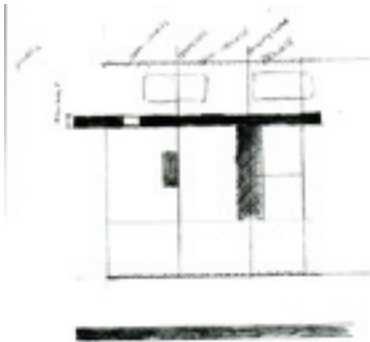


2.



Images from left to right: 1. Diagram investigating different site plan options. 2. Diagram showing different layouts for mini communities. 3. Images of “slice house” study model. 4. Floor plans showing different arrangements.



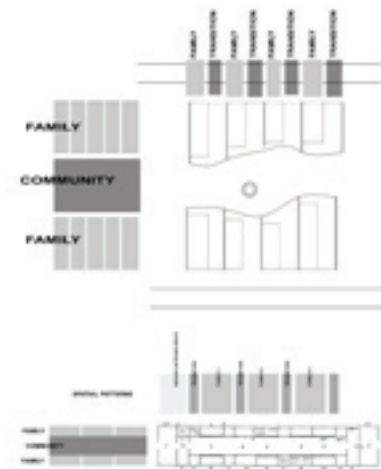
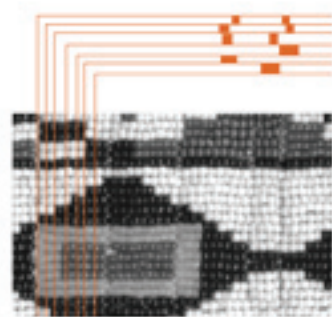
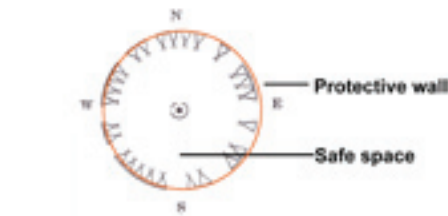


The critics at the review helped me to recognize that the second option was starting to go in the right direction; however they helped me realize that one of the most important things that I was leaving out was what happens in the immediate space surrounding the individual houses. This sparked some interest, and I noticed that the majority of tribal housing is currently single houses that are plopped onto the landscape with no correlation to how they relate to their neighboring houses. This lead me to my final design which is now a community prototype rather than what I initially proposed as a housing prototype. I also

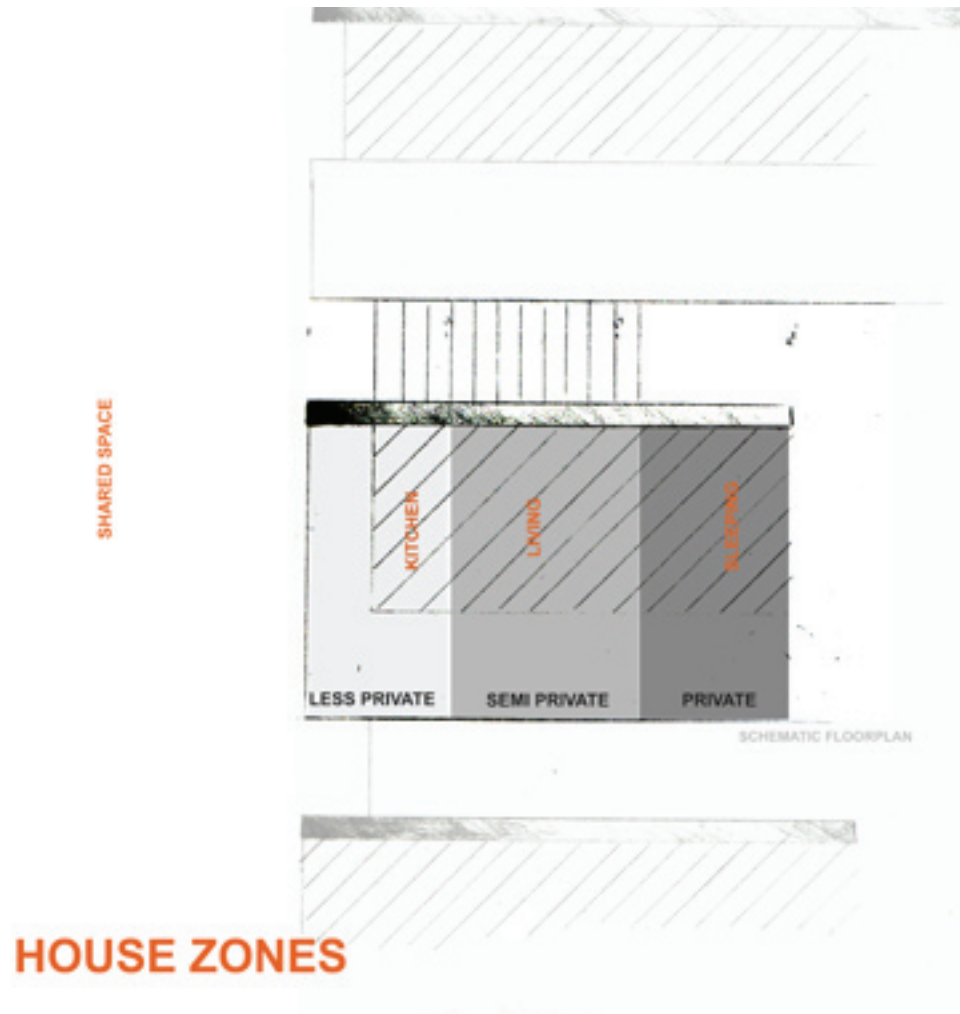
decided after the review that the idea of the flexible house was a little impractical. I wanted the house to be able to accommodate a family throughout its size cycles. This meaning that when a family has twins, they could simply go to the warehouse and purchase a new bedroom that attaches to the house. When the twins grow up and move out, the family could simply return the now unnecessary bedroom. I decided that this is an interesting Idea, but a more practical solution is to provide a variety of housing sizes within the community. This way a family just moves to a large or smaller house when needed.

The solution was to use the idea of the linear structure, in the form of straw bale walls built by the community (this is to promote sense of ownership and pride), with a protected space in the middle utilizing the idea of the spatial relationship of the tepee camp. The design focused heavily on deriving patterns from the longhouse, which was the most common housing type for the Winnebago before they were placed on reservations.

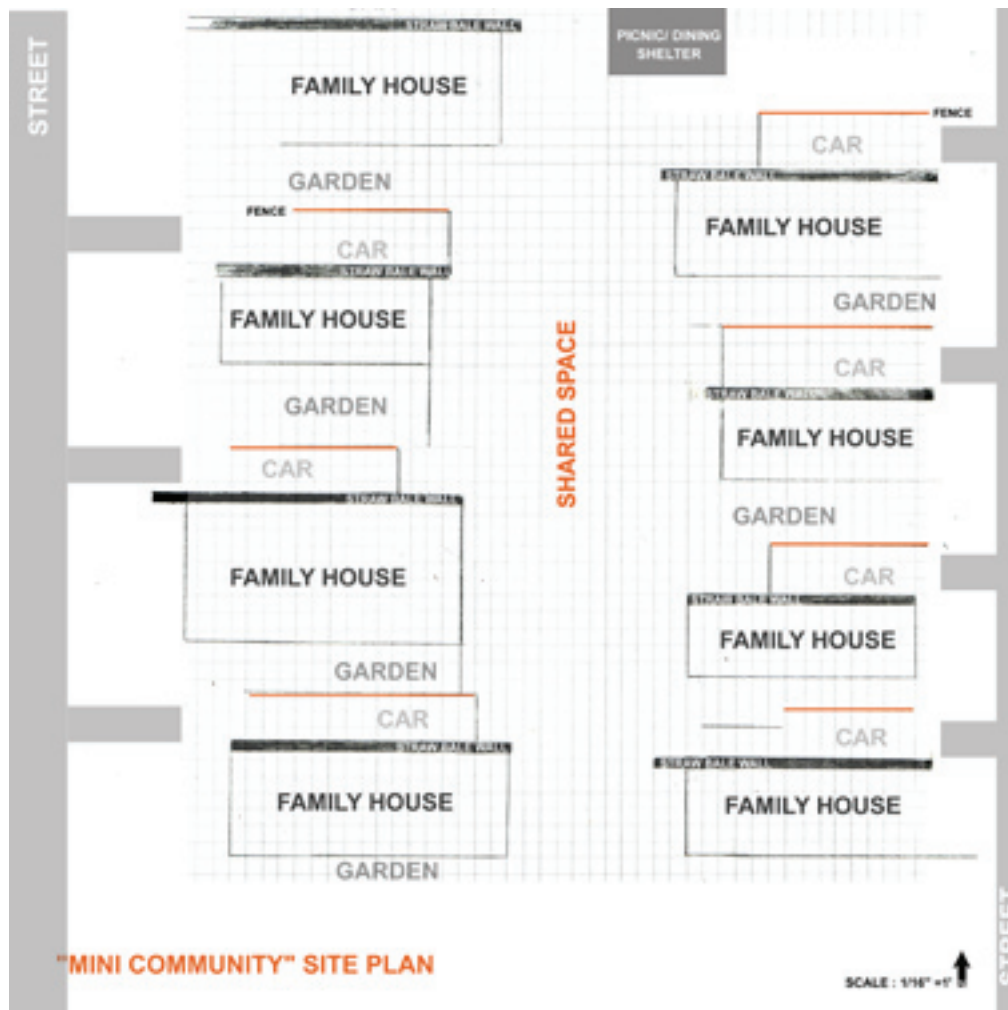
The houses were to include many levels of privacy,



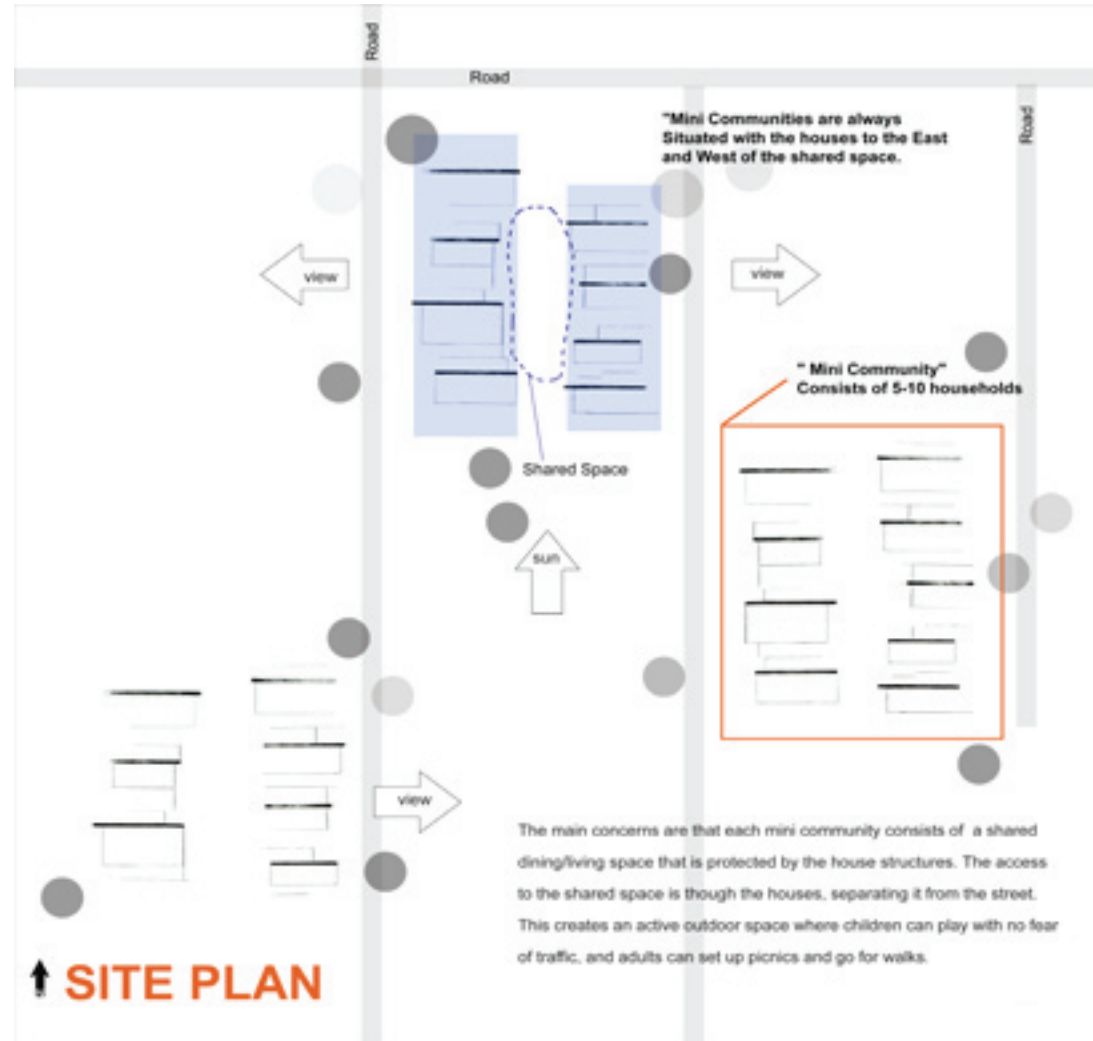
including a private outdoor space in addition to the community space. The number of units was determined by the size of the community space, so each mini community could consist of 8 to 10 houses. I worked with different spatial arrangements of the houses, one scheme where the car was parked on the opposite side of the straw wall, and another where the car was parked on the same side as the house but to the side instead of the back. I also experimented with different locations for the





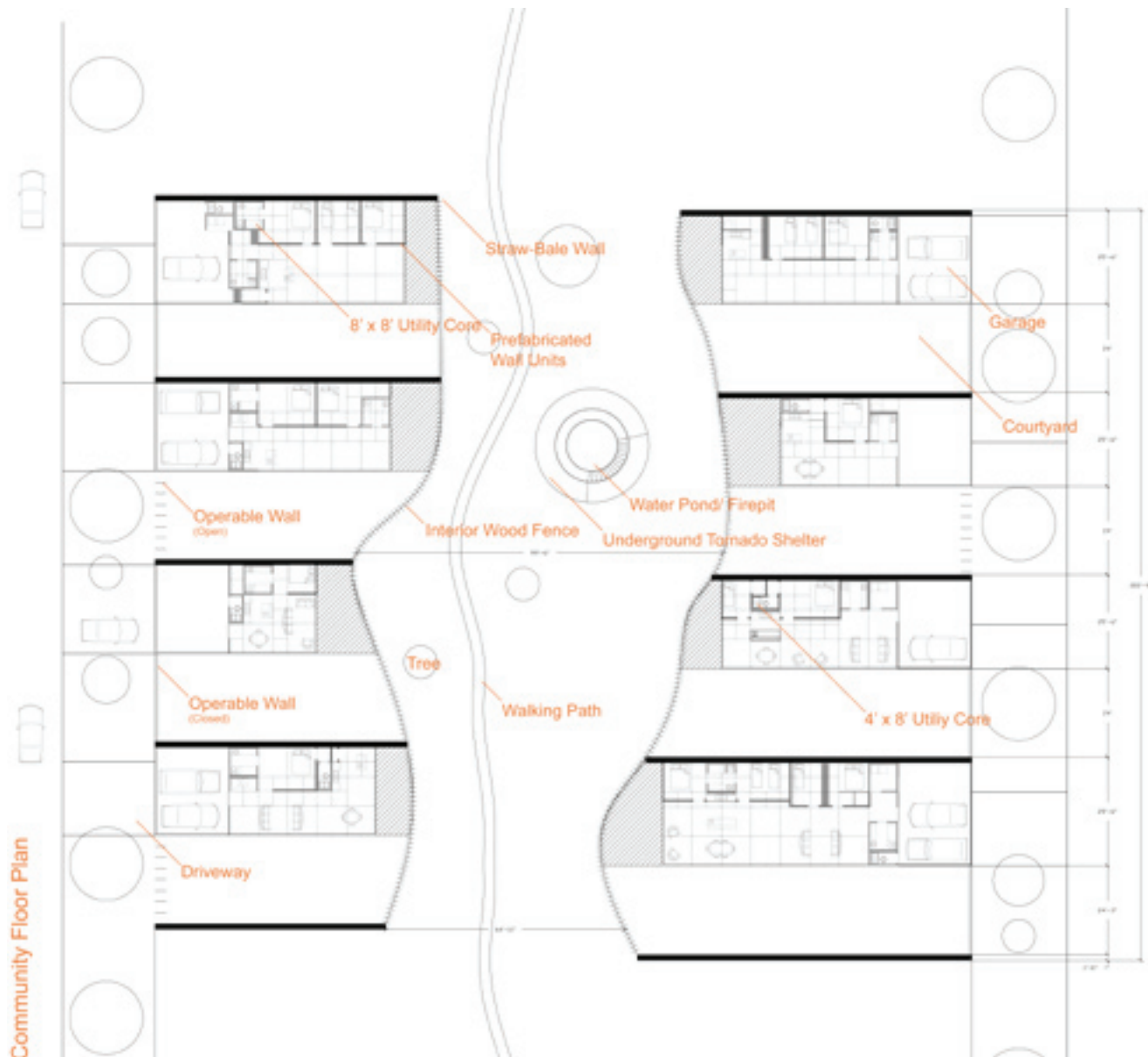


kitchen, bedrooms, and living spaces. The construction of the house was to utilize prefabrication. The space dividers (walls) were to be non structural prefabricated units, and the bathrooms, mechanical rooms, laundry rooms, and kitchen facilities were designed to be utility core units that could be placed where needed within the design.





Final Design

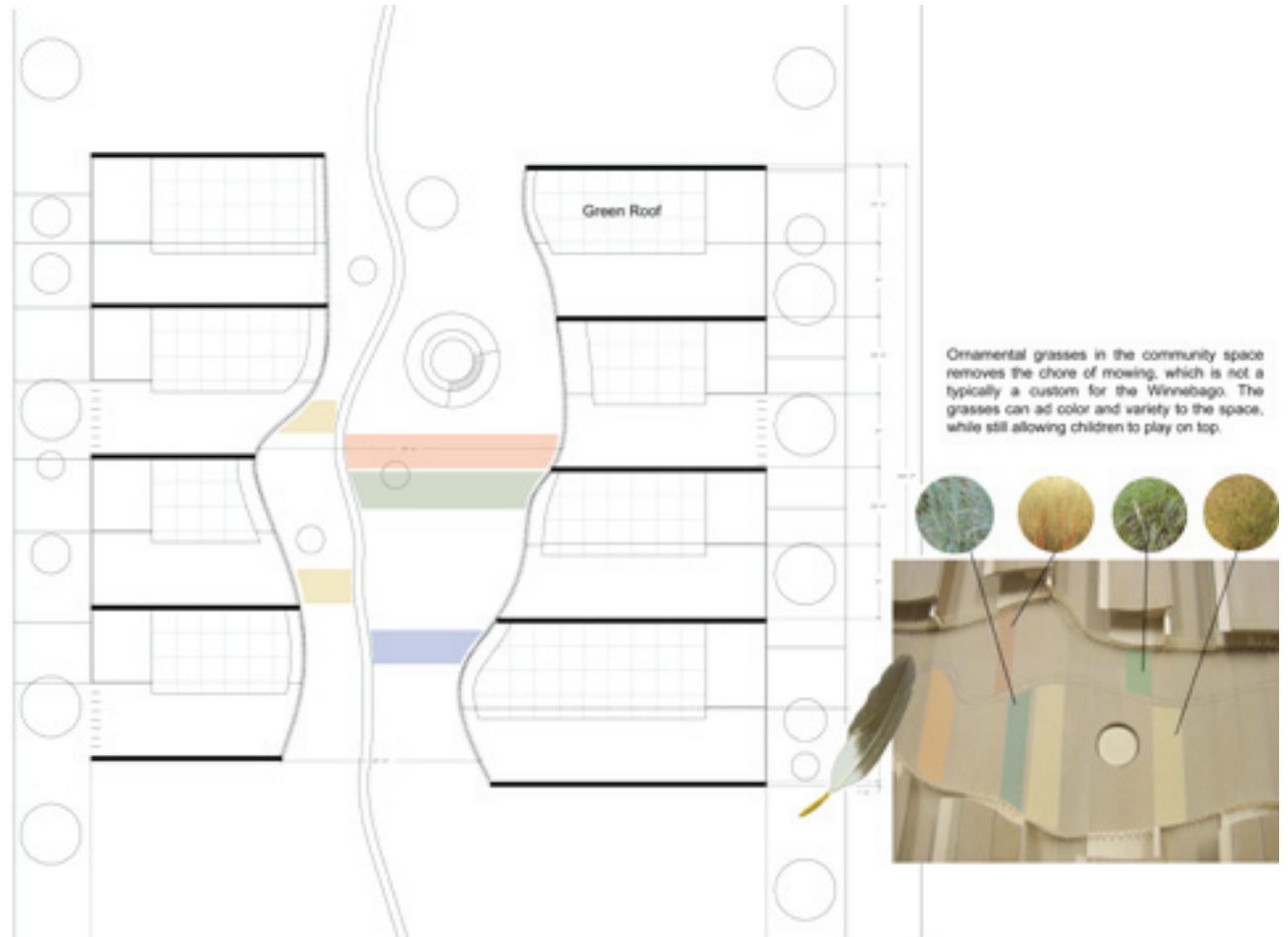


The final design was developed from the last process scheme described. It uses the three historical precedents of the Winnebago: the tepee, the beadwork, and the longhouse.

The mini community plan is arranged with straw bale walls to the north of each house. The houses are lined up from north to south with individual courtyards acting as buffer zones between properties. The community space is protected on the east and west sides by the houses, and the north and south sides with landscaped burms. The

overall design represents an idea of keeping the exterior of the mini community rigid, square, and hard; while the interior of the mini community space is organic, natural, and soft.

Vehicular transportation is restricted from the interior space of the mini community. This is meant to be a safe space where children can play under the protection of the community. This is also a place where families can hold their large dinners in the summer. The idea for the landscaping of this space is derived from a feather. Feathers are a very





important symbol for the Winnebago, so implying this idea is ideal. The walking path acts as the quill, while lines of different planted grasses act as the barbules. The space is designed so that it would never need to be mowed. This is another unique feature of the tribe; many people don't see it appealing, or necessary to mow their lawns. This design allows for people to walk over the different grasses, and still look interesting and manicured when not mowed.

There are two different designed fences in the mini community prototype. The fence on the interior is again, feathery. It is organically arranged, following the organic edge of the houses. The material is a new product developed in Germany. It is a wood that is heat treated to create a sealant. This wood could be driven into the ground without the need for a concrete base, due to the fact that it will not decompose. The interior fence is to create privacy, and a definition of boundary, while still allowing views into and out from the house.

The spacing creates a unique experience while walking next to it- from straight on you can see through, from an angle you can't.

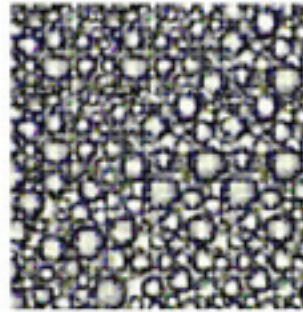
The outside fence acts like window blinds. The fence "posts" are larger in size, about 3' wide, and they pivot to open and close. One side of the "posts are wood, while the other sides are corten steel. The moving parts allow for the occupants to choose how exposed they want their courtyard to be to the street. It also creates interest from the street, throughout the day the exterior façade will change depending on the mood of the occupants.

Each family has a courtyard, which allows another level of outdoor privacy. It is a space that the family could have a garden, or just relax in. The space is to directly communicate with the interior living space, like a room extension, making the interior feel bigger.

The roofs of the individual houses are grass. The north of the straw bale walls are also green, covered with different types of vines, and crawling plants. This is to

### Phase Changing Material

Used for heat storage and to regulate temperature.



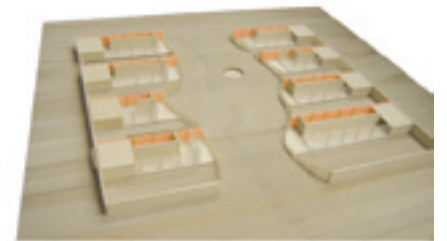
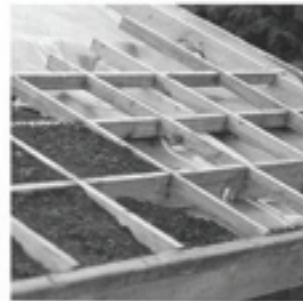
### Straw - Bale Wall

Used for insulation and community involvement



### Green Roof

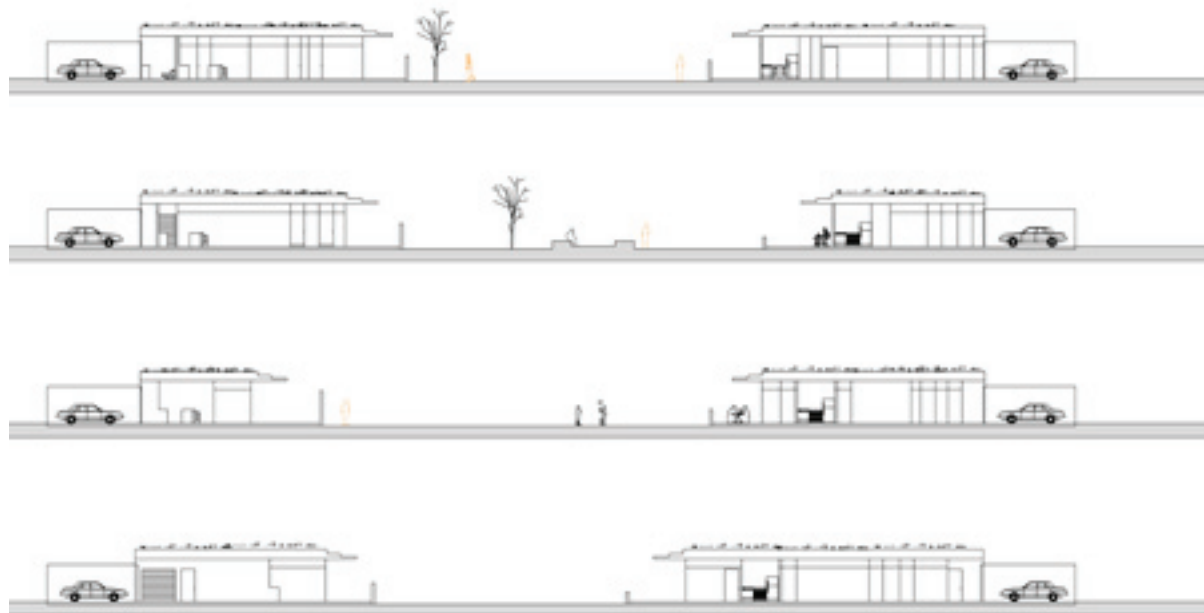
Used to insulate roof, as well as replicate historic use of natural building materials.



Green

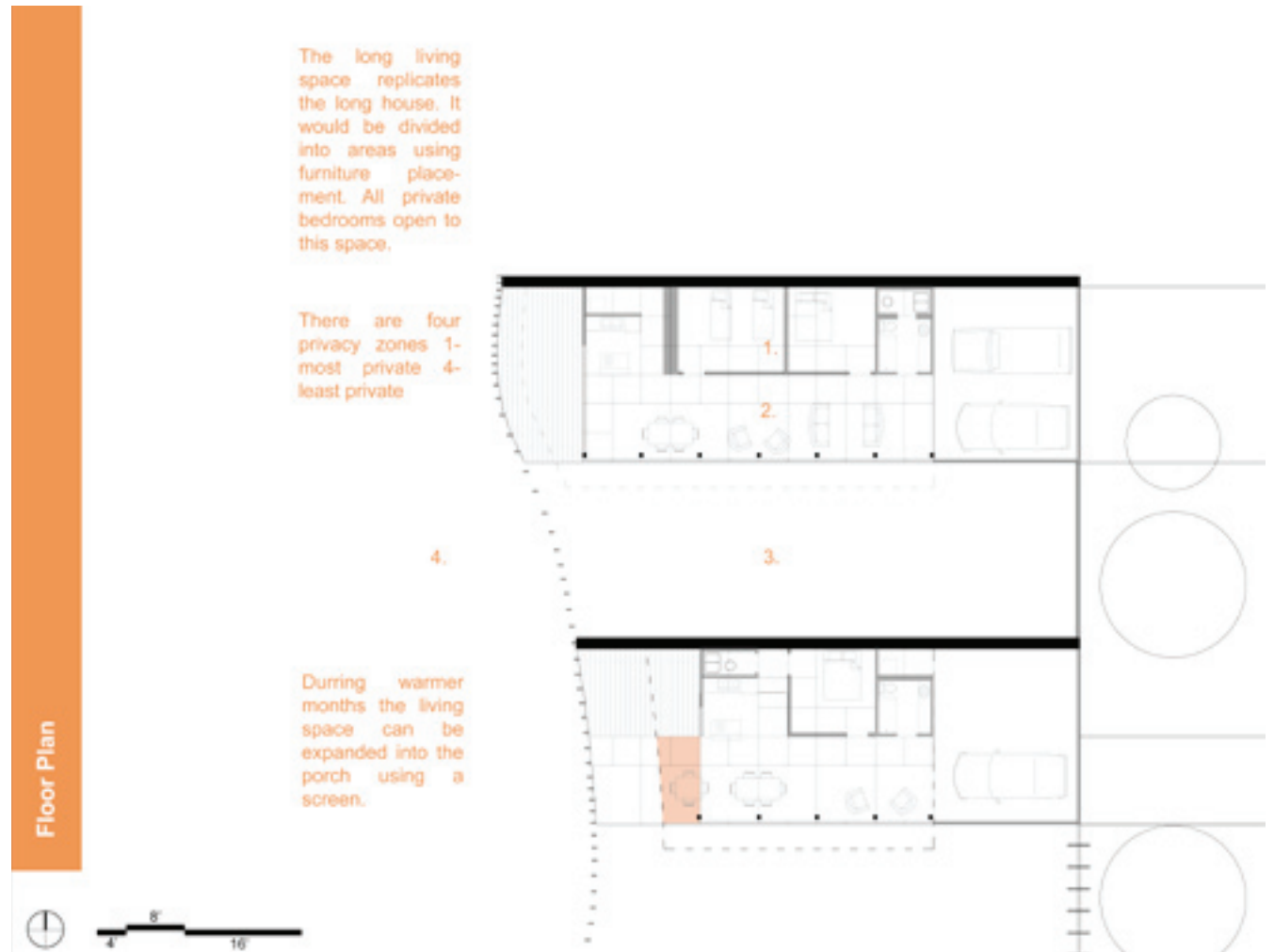
create a pleasant atmosphere for the person in the courtyard. A wall that is natural, which might change with the seasons, is very pleasant.

The interior of the house, as mentioned before utilizes prefabrication. The house is designed using a 4' and an 8' grid. This allows for variation within the grid, but still reduces cost with order. The walls are not structural so they can be moved to different locations within the house when needed. The utility cores would remain stationary, however the family can choose where, and which ones they would like.



The layout of the house is based on privacy zones. The bedrooms are placed on the north wall. This would be the darkest area of the house, and the most quiet (next to the straw wall). The next area of privacy would be the open living space. This refers back to the longhouse design in that all the private bedrooms open up to this single space. Then the privacy level decreases as you move into the courtyard, and then the community space.

Looking at the north/south section of the houses it is evident that the design is

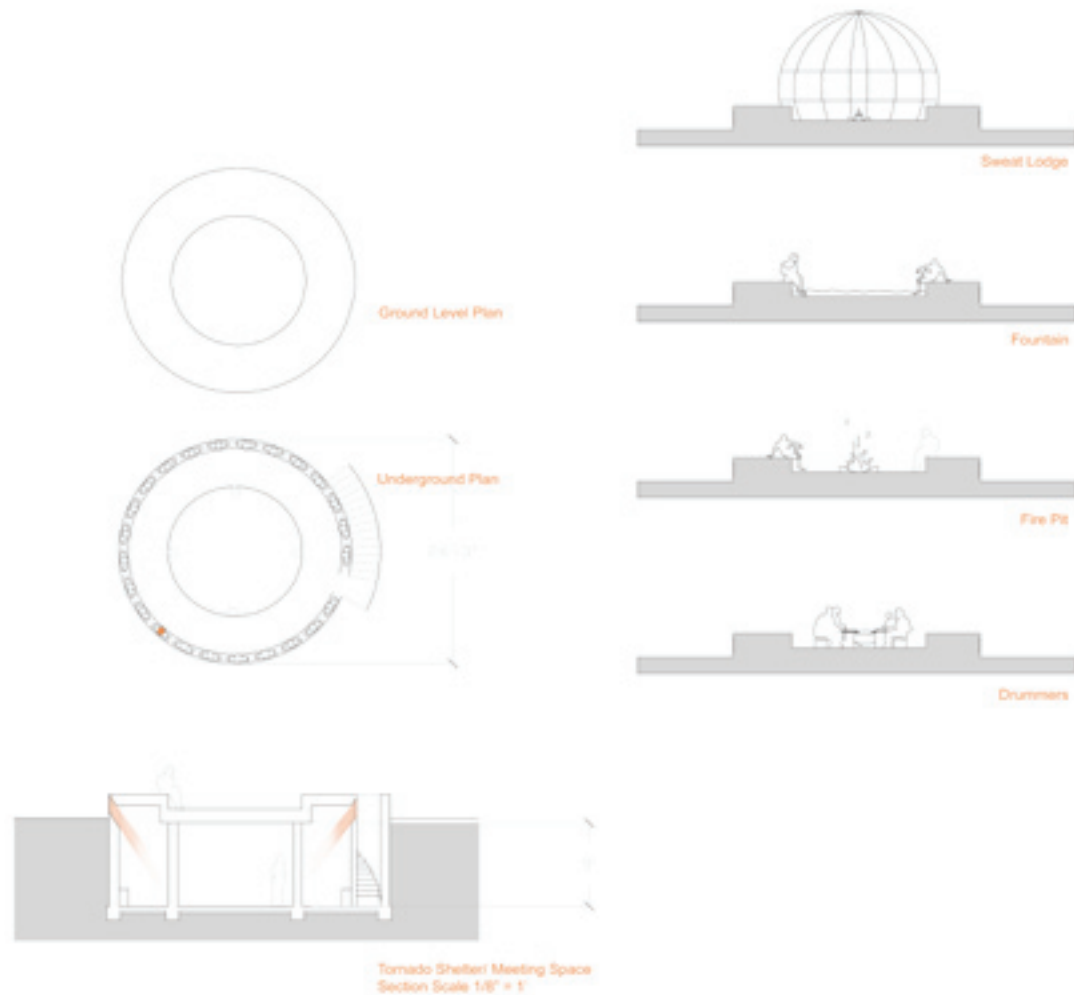




based off a passive house system. The south wall contains the main aperture, while the floor, north wall and roof are massively insulated (refer to page \_ for more information on passive design). The floor of the house is concrete, with ground pebbles for texture and color. The floor slab contains two elements to assist the passive design. On is the addition of a material called PCM, or Phase Changing Material. This is a wax-like material that acts as a thermal mass, but without the mass. It absorbs heat during the day through the sun, and releases it throughout the night.

The floor also contains water pipes that circulate water from deep below the Earth's surface. During the winter the Earth's core is warmer, and during the summer it is cooler.

The straw bale wall section shows the straw sitting on the foundation, with an interior treatment that is unusual to most straw buildings. Referring back to the interior of a tepee, the wall is stretched with a canvas material. The canvas is at an angle toward the wall replicating that of the tepee. Inside the wall is the lighting system creating a very soft "sleepy" light. The canvas can also be painted



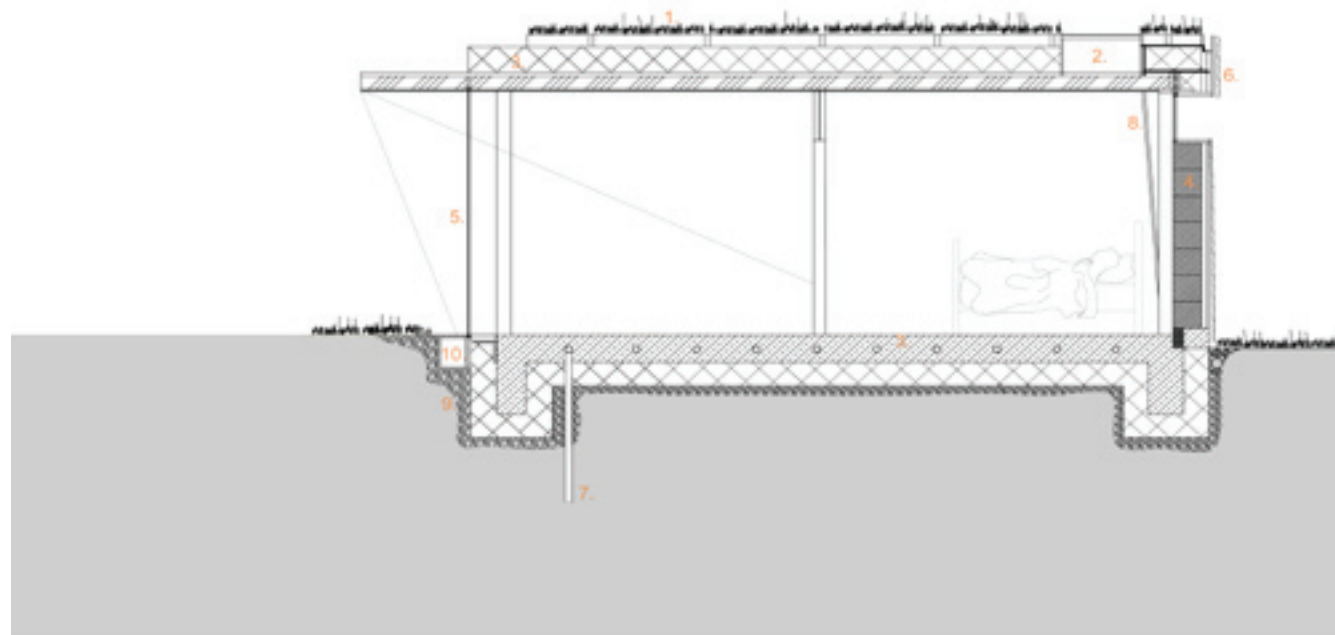
on in the same manner the Winnebago paint the exterior of their tepee's based on their families design. There is an aperture in the straw wall to allow air movement, and also a skylight, or in this case, a moonlight.

The ceiling is also designed to have a high R-Value. The structural component of the ceiling is once again the heat treated wood. This creates a large amount of thermal protection as well as creating an interesting texture and variable color.

The glass facing south would be a triple glazed design, it

North/South Section Scale 3/8" = 1'

1. Green Roof
2. Moon Light
3. Insulation
4. Straw - Bale Wall
5. Tripple Pane Glass
6. Vines
7. Water Pipe
8. Canvas Light wall
9. Gravel
10. Drain







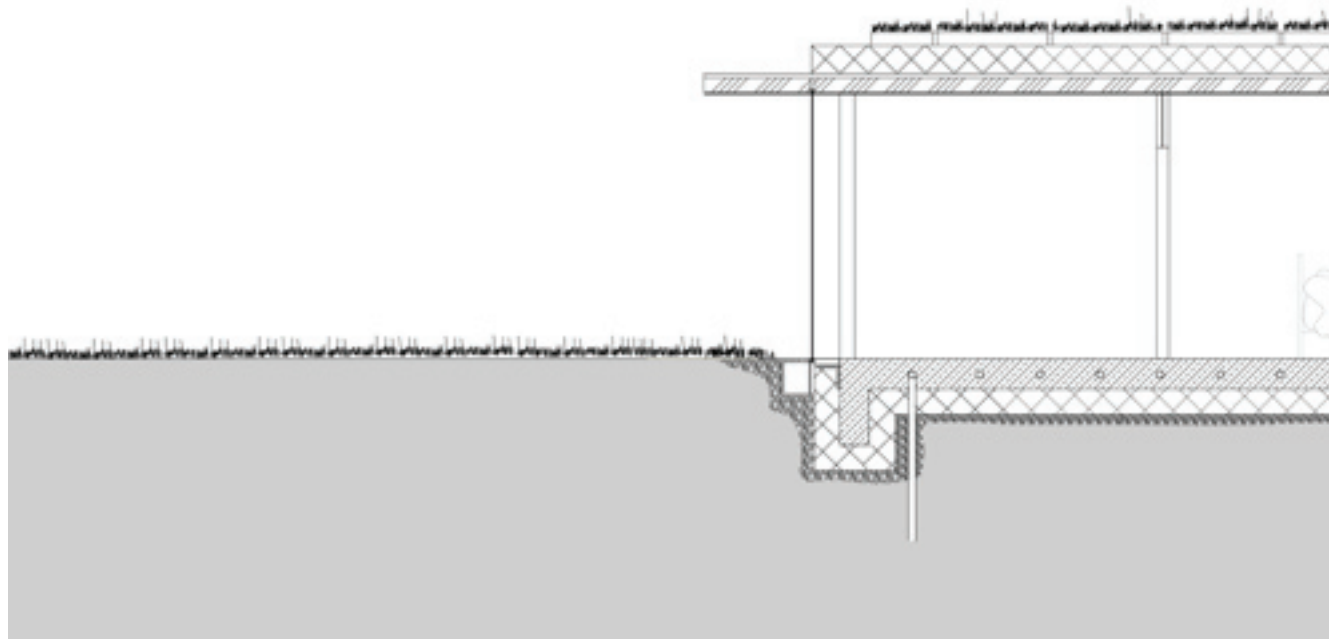
Passive House



Winter Sun



Summer Sun



would be embedded into the design of the ceiling to create a feeling that the room actually extends into the courtyard. The detail of the ground level is the same-the ground level meets the interior level, this in addition is to reduce the obstacles for a handicapped individual.

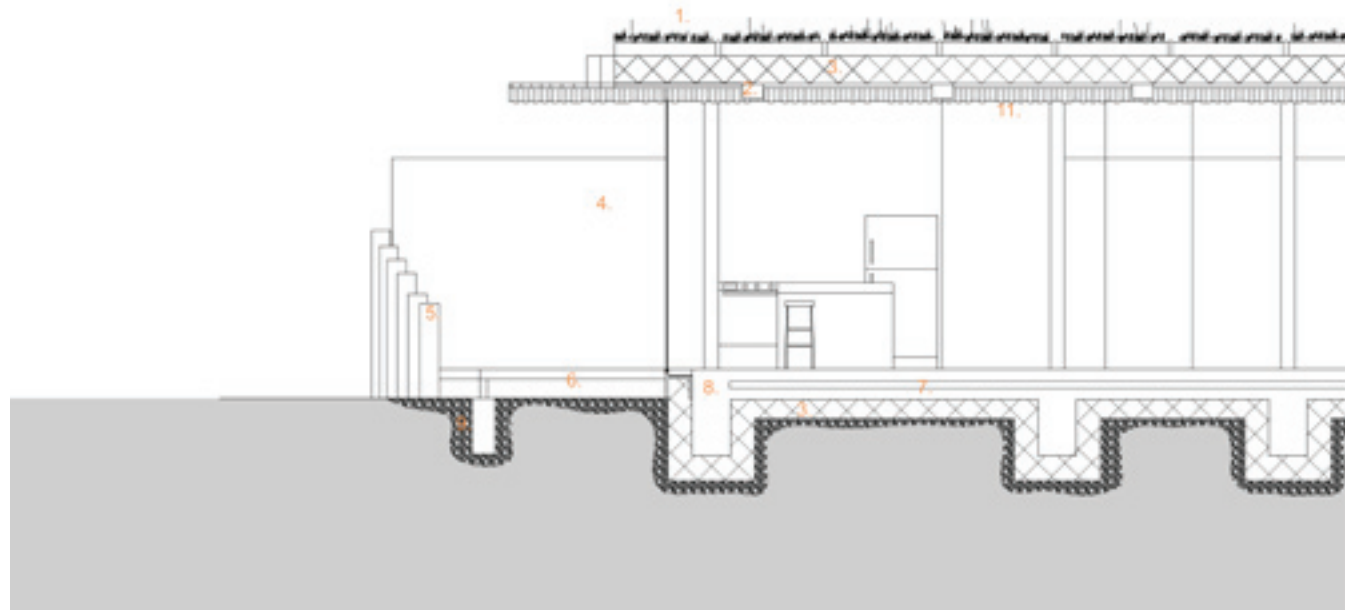
The houses are designed to be slab on grade to reduce the tell tale signs of the attached handicapped ramp. As mentioned earlier, there is a large percentage of tribal members who suffer from diabetes. The tribe's solution to their home accessibility is to

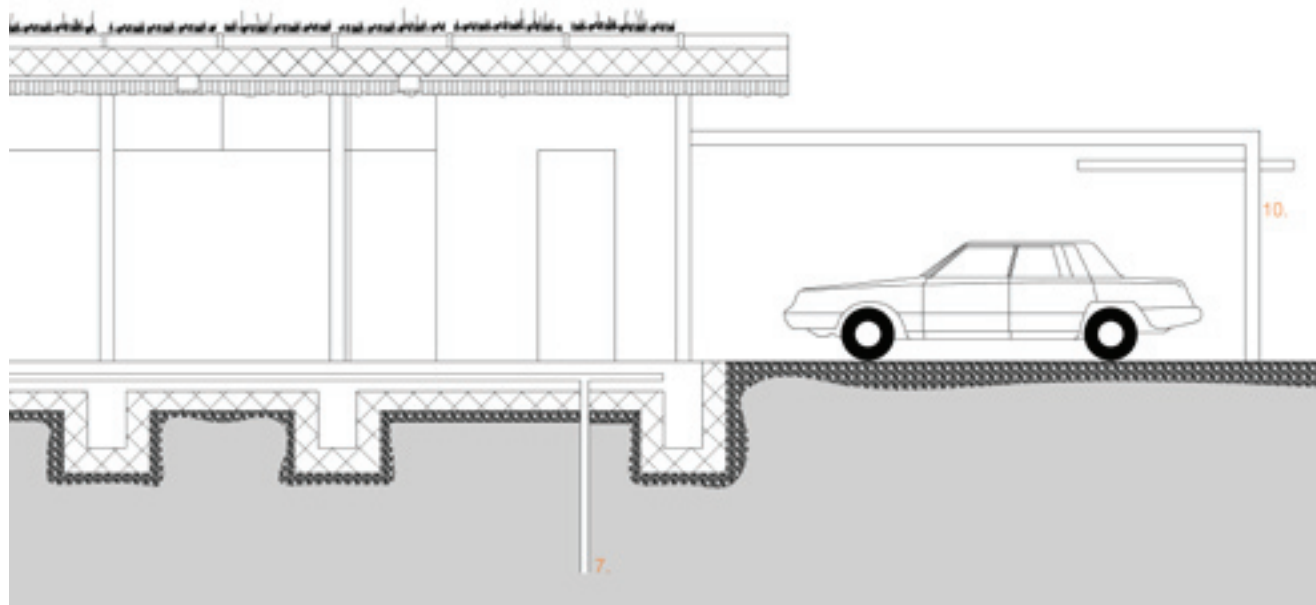
provide each family who is in need a attachable ramp. This pin points those families with the disease, and creates an embarrassing appendage.

Because tornadoes are an issue in Nebraska, there is a multi functioned space called the “multi purpose circle.” This space is a structure found in the community space. It is a tornado shelter when needed, as well as an underground space that could be used as a conference room, a dining hall, or a lounge. There are windows from above to give the space natural light and ventilation. The surface level

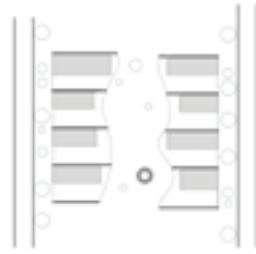
### East/West Section Scale: 3/8" = 1'

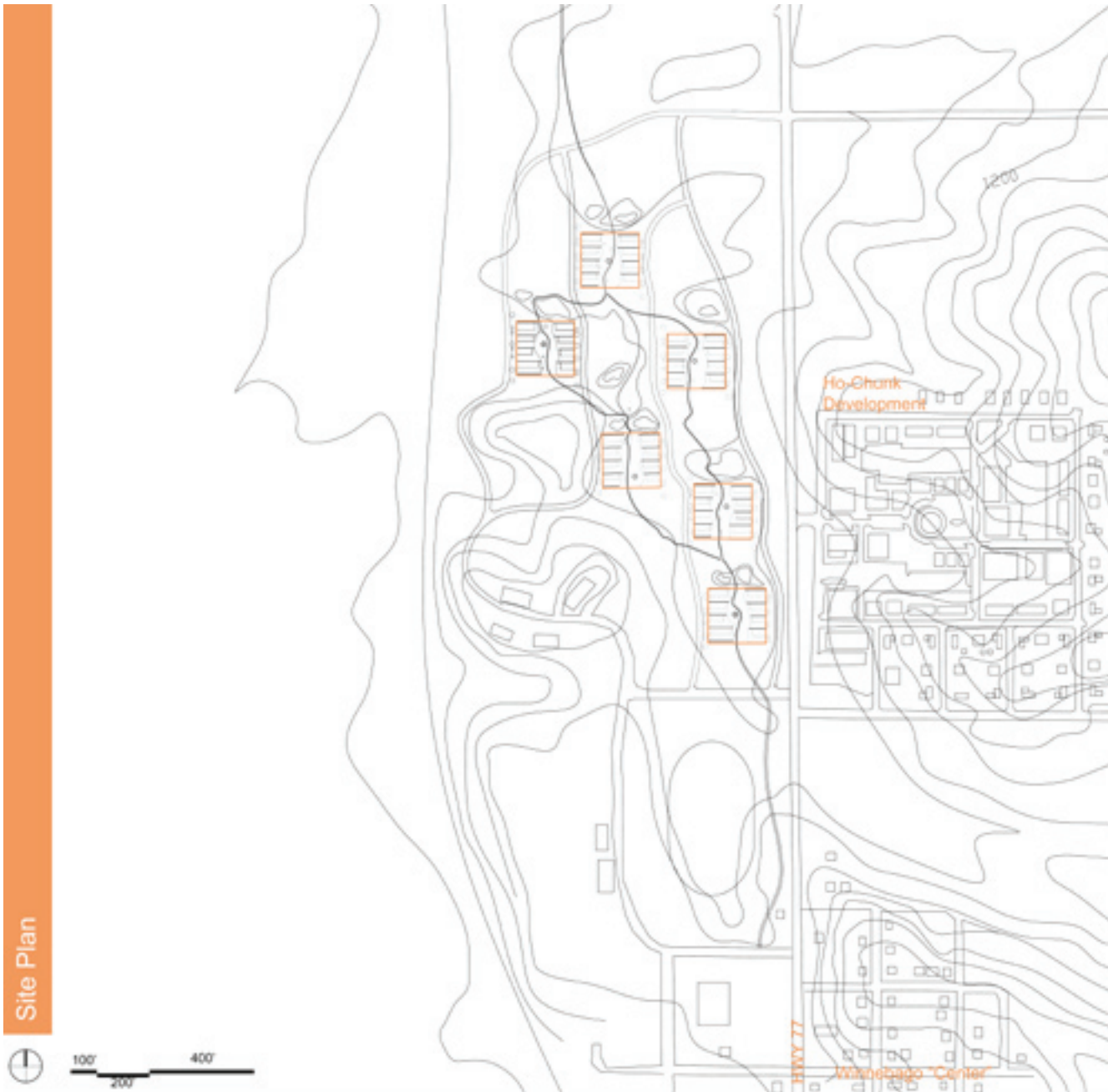
1. Green Roof
2. Air Duct
3. Insulation
4. Straw - Bale Wall
5. Heat Modified Wood Fence
6. Concrete and Wood Deck
7. Water Pipe
8. Concrete Slab
9. Gravel
10. Corten Steel
11. Heat Modified Wood





of the structure can be used for many purposes. It is designed to allow for a fountain space in the summer months. It could be used as a fire pit for warmth and roasting marshmallows, or even cooking large dinners. The space could also be used for ceremonial purposes such as small powwows, even a base to construct a sweat lodge.



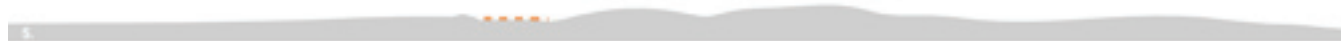
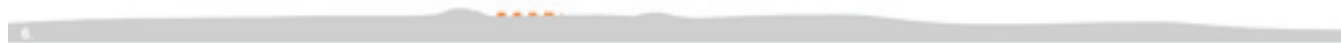
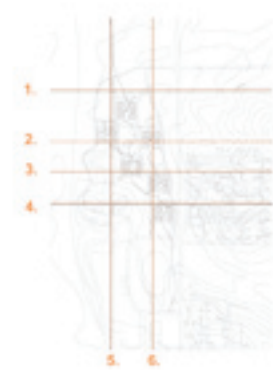


Because this is a prototype design the site plan would be designed as needed. The mini community design can be replicated many times without being exactly the same every time. The houses can change in size and number, and the shape of the community space can alter significantly.

I developed what could be considered the first phase of the project. I chose a site located to the west of HWY 77, and to the north of the school and business area. This seemed to be the best location for development for many reasons. One is that the tribe currently owns the area. It is now a buffalo ranch. The advantages of having housing on the same side of the highway as the school and

## Site Sections

other businesses are very important. There is concern with children currently walking from the Ho-chunk development across the busy road to school every day. The system of roads that connect the mini communities could be arranged in any fashion. This design was created to mimic the natural slopes of the landscape. The walking path connecting the mini communities is optional. The intent is to connect the communities through the centers rather than the streets.





1. Mini Community Space Must be oriented North.
2. Site must be large enough to accommodate more than 1 mini community.
3. Slope must not exceed 4% within the mini community.
4. There must be at least 180' between mini communities (when community spaces are adjacent).
5. There must be wind protection from the North.

### Prototype Site Requirements

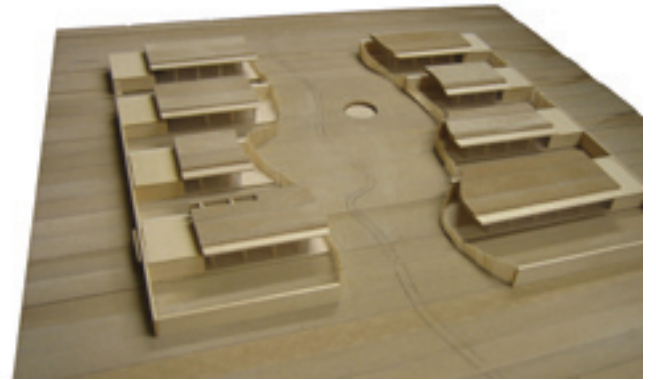
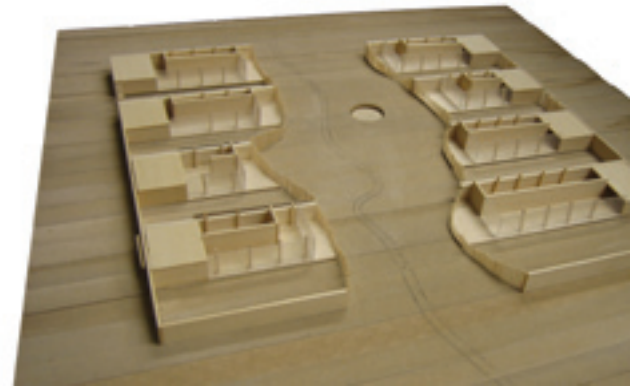


East/West Sections Scale: 1/32" = 1'



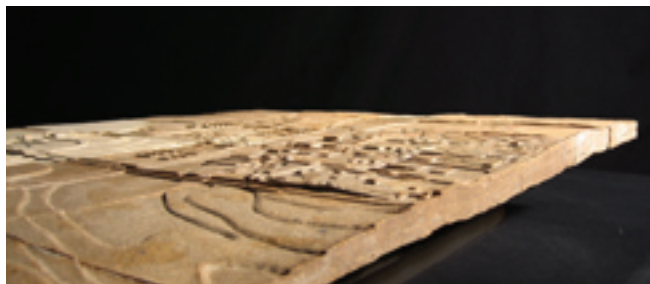


Mini Community Space  
Model made with bass wood  
and MDF.



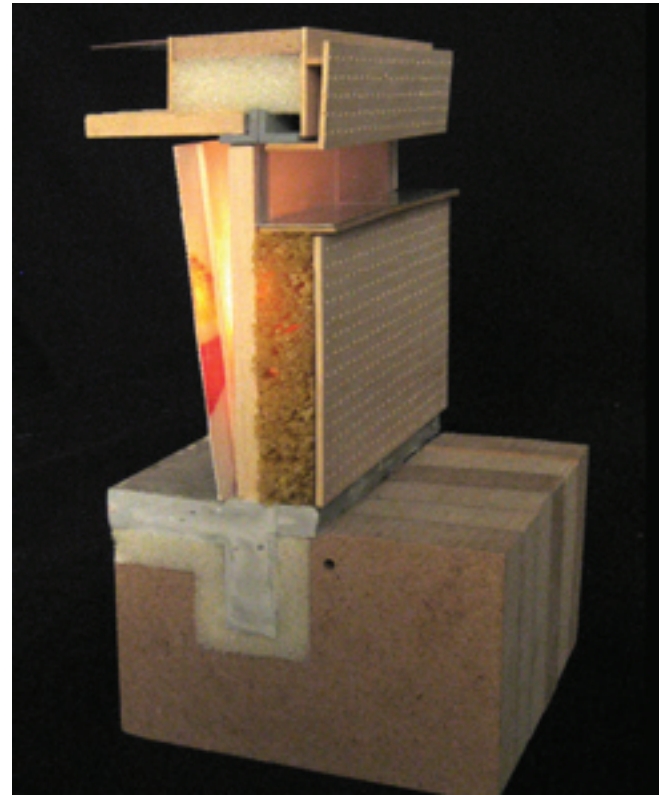


Site Model showing  
Winnebago area.  
Made with fired clay



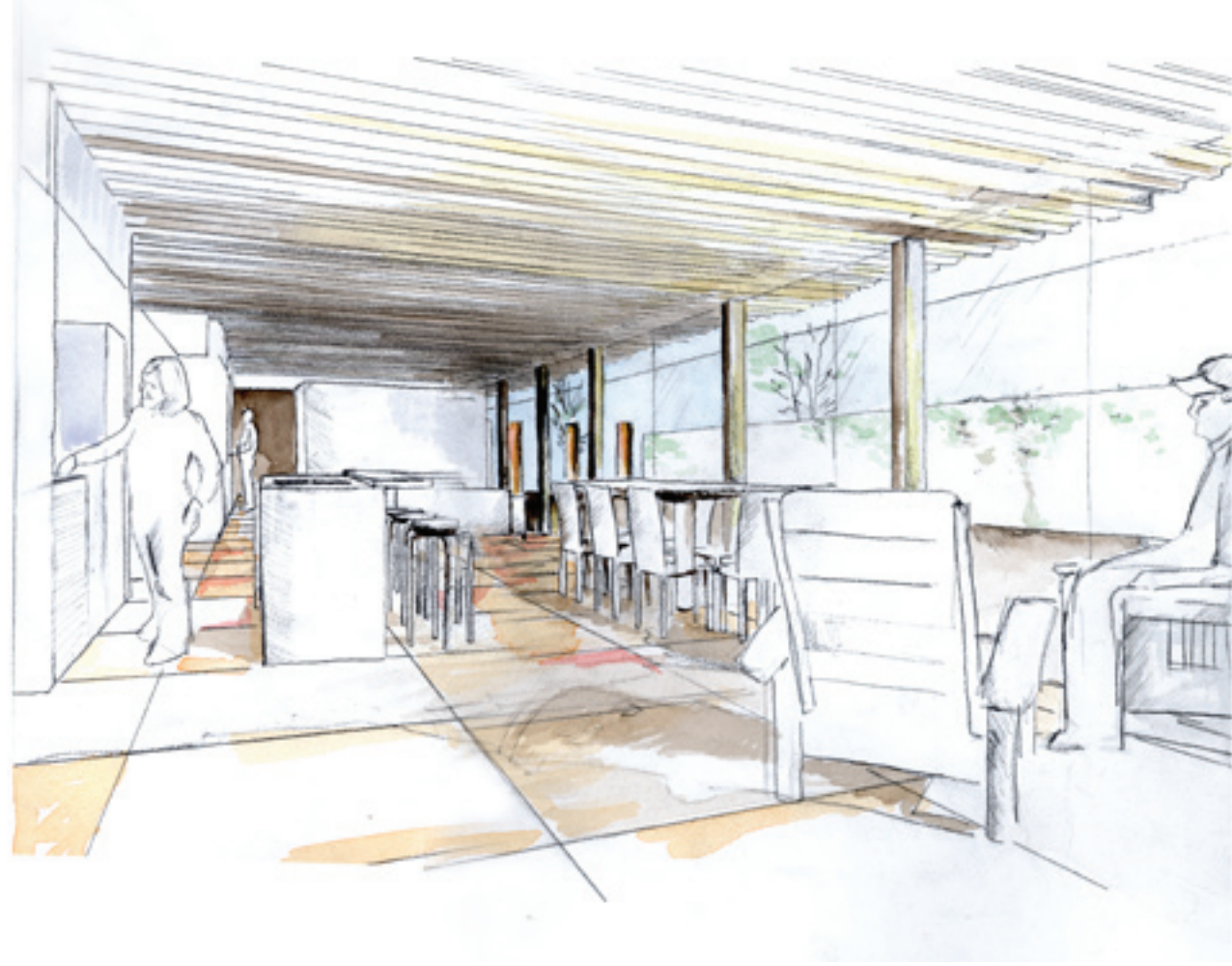


Section Model  
Depicting straw bale and  
canvas light wall.



Interior Living Space  
Watercolor





Courtyard  
Watercolor







Community Space and  
Front Porch  
Watercolor

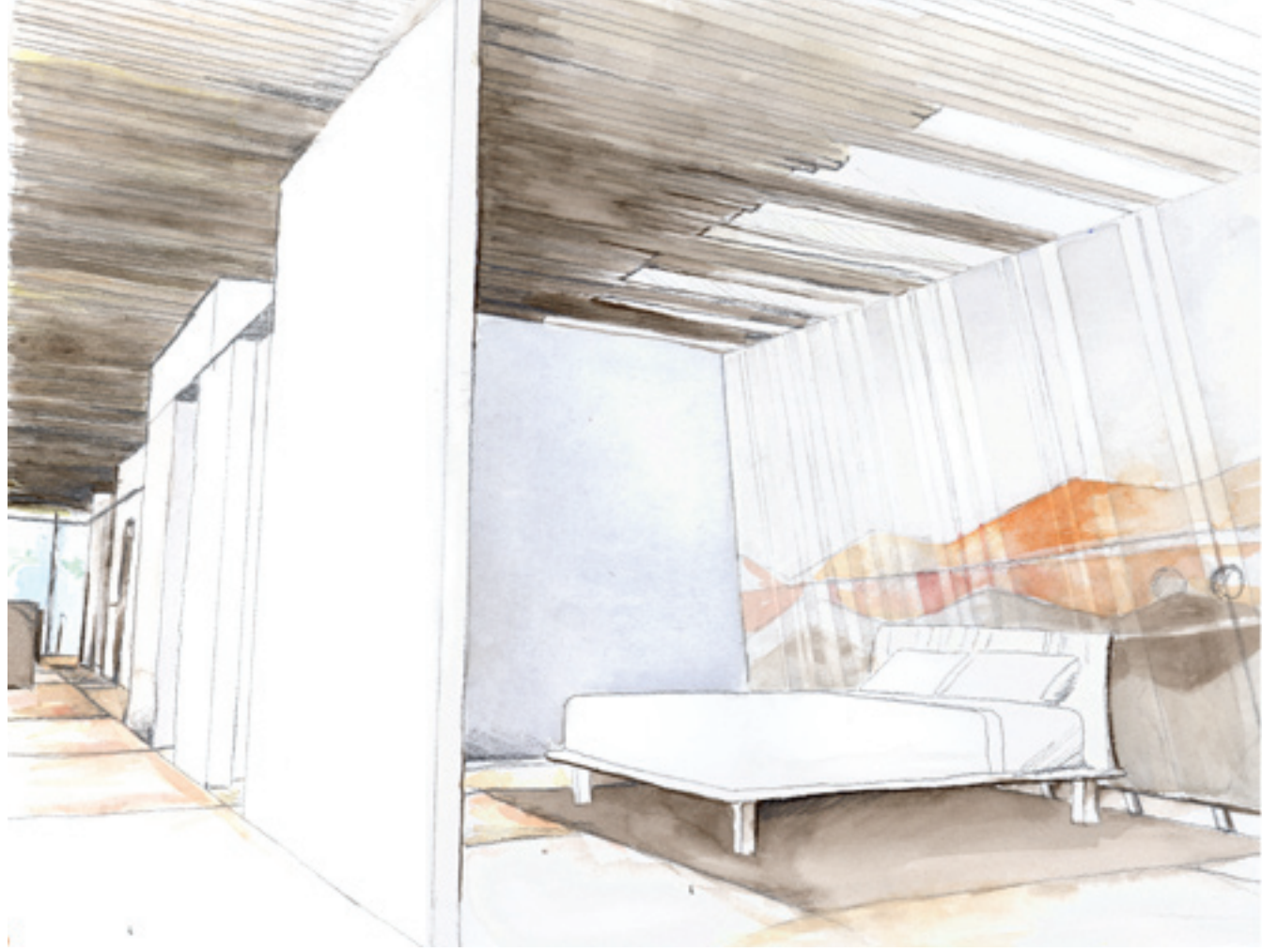




Section  
Showing Hanging Blanket  
Watercolor



Bedroom  
Watercolor





## Annotated Bibliography

## **Native American History**

Thornton, Russel. Sandefur, Gary. Grasmick, Harold. The Urbanization of American Indians. Indiana University Press. Bloomington: 1982.

From this book I mostly focused on the epidemic of Indians leaving reservations to become more independent individuals in urban cities. In 1955 the bureau of Indian affairs' developed a relocation program which assisted those who wanted to move. Most Indians helped in this system either moved to Chicano, or Los Angeles.

The major incentive for migration is economic, Indians moved to urban areas hoping for more job opportunities, better jobs, higher wages, and improved living conditions. The extended family is a crucial social and cultural component of Indian life. It makes it more difficult for an Indian or Indian family to move. Kin network on the reservation constantly exerts pressure on the individuals to remain in, or return to the reservation.

The Indian functional family in the city consists of several individual household nuclear families providing support for one another. They might all live in different houses and different locations but they remain connected and share their resources as needed.

Prucha, Francis. Americanizing the American Indians. Harvard University Press. Cambridge, Massachusetts: 1973.

From this book I took mostly the dates and laws passed over the native Americans. It describes the process of the reservations, and the many laws that were developed in the "control" of the native American. How America wanted the Indians to be brought under the protection and the restraints of the law, just as other citizens were. Describes in depth the ideas of the Dawes Act (1887), which first separated the Reservations into individual owned plots of 160 acres.

Discusses the early reformers' ideas of total assimilation of the Indian into Anglo society. "can they be civilized?" There was another group (National Indian Defense Association) who wanted to maintain tribal organization and tribal property until such time as the Indians themselves saw fit to change their way of life. This group was quickly defeated by the reformers.

Parks, Larry. Native Americans: Current Issues. Nova Science Publishers, Inc. New York: 2002.

This book addresses current issues dealing with native Americans including Indian law, Indian heritage and gaming questions.

The Indian health service (HIS) under the authority of



the Snyder Act of 1921 carries out the federal responsibility of assuring comprehensive preventive, curative, rehabilitative, and environmental health services for approximately 1.4 million American Indians and Alaska natives.

Newcomb, William. North American Indians: An Anthropological Perspective. Goodyear Publishing Company, Inc. Pacific Palisades, California: 1974.

This book gives a detailed history about the Indians in north America. I focused my attention to Chapter 3, the Northeastern hunting-farming tribes. This includes the tribe of Winnebago because they were originally from the Great Lakes area. Chapter 4, about the great plains Indians, I focused on this chapter as well because the Winnebago later moved to this area, next to a tribe from this area.

The Winnebago were of the Algonquian Linguistic family. They were archaic people who followed a hunting, fishing, and gathering way of life. Slash and burn agriculture was pursued wherever it was productive, corn, beans, squash, pumpkins, sunflowers, and tobacco were raised. The most popular house was the longhouse. It was up to sixty feet long and eighteen feet wide and high. Gabled roof, the longhouse was constructed on a framework of poles over which were tied slabs of elm or cedar bark. A wide hallway split the interior, with individual families occupying sections, or compartments, along each side. Compartments were furnished with sleeping platforms. Families opposite one another would share

a common fireplace. At the ends of the long house were storage areas for the common supply of dried corn, other food, and firewood. Other wigwam structures were used as less permanent housing for hunting camps. There were also a number of other buildings such as sweat lodges, ceremonial grounds, and menstrual huts.

The basic unit of society was a matrilineal extended family, which occupied a longhouse. Composed of nuclear families related to each other through the female line, the activities of the family were directed by an older woman of the family. On marriage, men moved to the long house of their wives, but remained an outsider, they acquired no property rights, and no political positions of the house.

Their beliefs: The great spirit was a creator of other supernatural beings as well as animals, plants, everything. The great spirit had a twin brother who was his malevolent counterpart, an evil spirit.

### **Native American History: Winnebago Tribe**

Radin, Paul. The Autobiography of a Winnebago Indian. Dover Publications, Inc. New York: 1963.

This book takes the reader through a life of a man living in the Winnebago tribe before the creation of America. It is very descriptive in the early years through the changes of

puberty, the chores and daily lifestyle in the tribe. This book was helpful in giving an insider's perspective to the tribe.

Radin, Paul. Winnebago Hero Cycles: A Study in Aboriginal Literature. Waverly Press, Inc. Baltimore: 1948.

Radin, Paul. "The Winnebago Tribe" Smithsonian Institution bureau of American ethnology annual report 37: 1915-16.

### **Cultural Differences in Housing/Architecture**

Martin, Tania, Andre Casault. "Thinking the Other, Towards Cultural Diversity" Journal of Architectural Education Sept. 2005: 3

This article describes an architecture studio's project of working with a native tribe in Quebec. It takes the reader through the process and problems the students must face to design for a culture other than their own. Their goal was to design a housing type that better responds to Amerindian sensibilities while procuring for its inhabitants the benefits of modern conveniences and technologies to which they have become accustomed.

Bell, Bryan. Good Deeds, Good Design: Community Service Through Architecture.

Princeton Architectural Press. New York: 2004. Pages 93-97

This book, I took from it the chapter on Red Feather Development Group. It illustrates the founding of the organization and the process that Robert Young, the founder, went through to develop it. This organization works with the rehabilitation of native American homes on reservations, as well as building new houses. They have worked with architecture students at the university of Washington to design straw bale houses. They have since used this technique due to its availability and the nature of its construction. People in the community join together to build the straw bale homes themselves, saving money and giving the community a larger sense of pride and ownership.

Brolin, B.C. Two Case Studies in the application of the modern Ideology Van Nostrand Reinhold. New York: 1976 88-103

This paper was an interesting evaluation focusing mostly on a city development in Chandigarh, India. The focus was looking at Modern Ideology which is a statement about how people should live and how the containers in which they live should look. This new neighborhood was an expansion to a city that was growing. The design was done by Le Corbusier, who placed his ideas of homogenization of the world, and

his assumptions about every day life into the community. It was explained in detail what sort of design decisions were making the families living in the area feel out of place socially. The designers did not take into considerations the cultural living patterns of the Indians who inhabited the area and the homes. The landscape was designed with a large park called “Leisure Park” that weaved throughout the city. It was hoped to be used as a place of activity, leisure, and entertainment, but instead was mostly un-used by the people due to cultural preferences of using the home for these activities. There were also problems with the design of shopping centers that were intended to be used as a place for multiple stores selling a variety of goods. This way the families could stay within their area without leaving to get every day necessities. But because of the regions preference for bargaining and shopping in bazaars, the shopping centers became places for selling merchandise of the same category.

The housing that was designed for the community was another problem. The homes were designed for the common westerner, rather than a person from India. The families who inhabited the home had to re-adjust the rooms to accommodate their needs. Some of the rooms were no longer used for their original planned purpose. The kitchen was the most disappointing room in the home. The room was so small that it didn’t allow for all the family members to eat together at one time. The space allocated as the dining area was not feasible due to the Indian tradition of eating Chapati, which requires eating immediately after cooking. This seems to be

a very drastic situation of mismatching cultural traditions with an architect’s assumptions. Imposing the traditional western ideas on the Indian people of Chandigarh was extremely unsuccessful and frustrating.

This concept is an extremely important topic for architects and designers today. So often are architects involved in designing for cultures other than their own, that they should know the results of their misunderstood assumptions. One important thing that is discussed in the other two documents is the importance of post occupancy evaluations. There is no way an architect can learn from his/her mistakes if there is no research done after the building is inhabited. Hopefully Le Corbusier did not get commissioned to produce another city such as this without discovering what his mistakes were in Chandigarh.

I think too often architects try to impose their design ideas on people rather than letting the client teach the designer what works for them. We learn early on in design school that we are more knowledgeable in aesthetics and planning than the client. We are taught to defend our design work in critiques rather than agree to everything our critics tell us. Thus we are more likely to repeat this role for the clients and defend our work against their criticism. In cases where there are cultural differences between the architect and the client these problems can be made more extreme. I think it would be a logical consideration to adapt at least one required course in the architecture program that made a student work with a culture other than their own.

Groth, Paul. Bressi, Todd. Understanding Ordinary Landscapes. Yale University Press.

Pages 56-66 (Rina Swentzell, "Conflicting Landscape Values: The Santa Clara Pueblo and Day School. )

This article explains the contractions between the housing desires of the Santa Clara Pueblo, in New Mexico and the Bureau of Indian Affairs. It takes a very personal perspective of the child (Rina Swentzell, Same person interviewed in "on her own terms"). Talks about the differences between what the American government thought of play time, verses school time. The Pueblos did not separate the two, while the government put up walls and fences around the school, and a separate play area that they could only use during recess. This article also addresses the difference in the way the pueblos viewed the earth. They liked having dirt walls and floors, believed there was an energy that flowed directly through the earth and rocks to their skin.

The author says that her experiences show that once the Bureau of Indian affairs changed their physical settings, lack of confidence and feelings of inadequacy had become a characteristic trait of children who lived in these new homes and schools built for an American.

Nabokov, Peter. Easton, Robert. Native American Architecture. Oxford University Press. New York: 1989.

This book is a textbook format describing all historic types of Native American architecture. I focused specifically on chapter one which looks at the architecture of the Northeast and great Lakes areas where the Winnebago tribe was initially from. It describes the two most common types of housing: the wigwam and the Long house.

The wigwam was created by taking saplings that were gathered and chopped by the men, they used young hickory, basswood, or elm trees for this. To secure the poles, the supple tips were wound around each other of overlapped, the lashed together with pliable strips of fresh white oak, or roots. Women then sheathed the frame and installed the furnishings. They used wall mats and floor mats, the women would sew the mats using needles made from animal bones. They had to survive in an extreme environment, their homes were pliable, lightweight, and provided effective insulation. They utilized the principle of insulation by means of walls enclosing a dead air space in which convection currents are retarded by filaments. The walls are the outer layer made up of the hard lower half of the leaves, while the filaments are the inner layers of thin leaf tips. Inside the wigwam, the fire was placed in the center, smoke escaped through a parting in the mats.

Another type of dwelling was the long house. This was a large structure that was divided internally into different family partitions. Some families would share a fire in the middle, but there were many rules about stillness and quietness as you moved from room to room.

Krinsky, Carol. Contemporary Native American Architecture. Oxford University Press  
New York: 1996.

"A Home of Their Own Program for Native Americans."  
Architectural Record Sept. 1994. 182 n.9 P. 19.

"On Her Own Terms" Historic Preservation Nov. Dec.  
1992. 44 n. 6 p 26-33, 84.86.

This article describes a pueblo woman who has a degree in architecture and historic preservation. She describes the land of the pueblo, and the Americanized ideas of historic preservation and the pueblo. The pueblo homes are something that are more alive than what the common American thinks, "they would bless the home, feed it, pray for it, and sometimes it would get sick, and sometimes it was time for it to die."

Chester, Carl. Home Not Sweet. American Indian Housing Council. Sept. 20, 2004

Smith, David. The Winnebago Tribe. Encyclopedia of North American Indians. <[http:// college.hmco.com/history/readerscomp/naind/html/na\\_043200\\_winnebago.htm](http://college.hmco.com/history/readerscomp/naind/html/na_043200_winnebago.htm).

### **Prefabricated Homes**

"A Modular House that's Different" Architectural forum:

1972 Oct. v. 137 n.3 p. 60-63

"Who's building Modulares" House and home 1971 May  
v. 39 p.46-59.

"Housing: the mod business" Progressive Architecture  
1971 May v. 52 p. 116-118

"Self help and beyond" Architectural Forum: 1970 March.  
V.132 n2 p. 52-53

"Modular Materials" Arts and Architecture 1967 April v. 84  
n. 4 p 13-15

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Birkhauser Publishers. Boston:  
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Cahners publishing company, inc. 1971: Boston.

Department of Economic and Social Affairs. "Modular Co-Ordination of Low-Cost Housing. United Nations, New York: 1970.

Serverino, Renato. Equipotential Space. Praeger Publishers. New York: 1970.

"Low Budget Housing" V. 175 September 1998.

### **Co-Housing**

McCamant, Kathryn, Charles Durrett. CoHousing: A contemporary Approach to Housing Ourselves. Berkeley: 1994.

Addresses the need for a new housing type, with the changing lifestyles of people today it is hard to spend so much time driving to places to socialize. Co Housing was invented in Denmark. It is a housing type that combines the autonomy of private dwellings with the advantages of community living. Each house has private residence, but also shares extensive common facilities with the larger group.

The authors describe in detail several groups that have accomplished their goal of developing co-housing. It gives examples of small projects including about 6-8 homes, medium projects, and large projects including 30-40 homes.

The book gives an interesting perspective by taking you through an average day or part of day living in a co-housing development from many different perspectives including a mother, a father, and elder man who's wife passes away, and a nine year old child. The book also describes the different systems each organization uses for sharing duties, chores, and money.

### **Green design**

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Magwood, Chris, Mack, Peter. Straw Bale Building: how to plan, design and build with straw. New Society Publishers. Gabriola Island, Canada: 2000.

Mackenzie, Dorothy. Green Design: Design for the environment. Laurence King Publishing. London:1997.

Osmundson, Theodore. Roof Gardens. W.W. Norton and Company. New York: 1999

Quinn, Martin, Catherine, Macleod. Grass Scapes: Gardening with Ornamental Grasses. Ball Publishing. Batavia, Illinois: 2003.

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